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JULY 1966
VOLUME 84 NUMBER 1

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Murdock Equen

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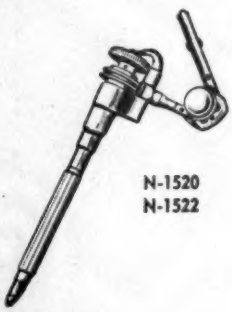

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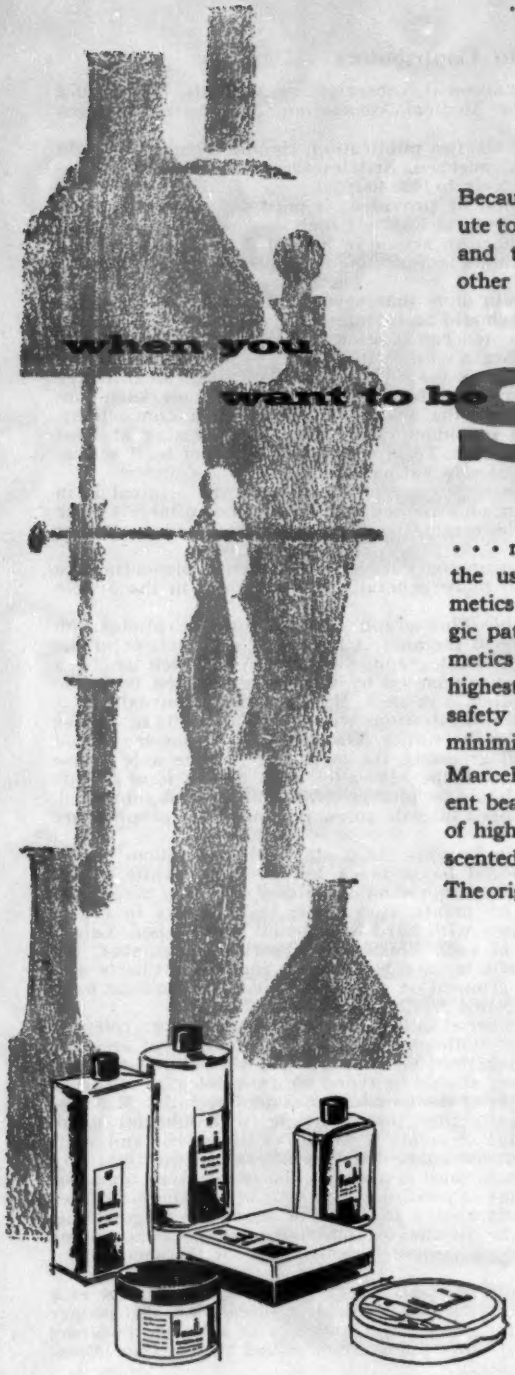

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A.M.A. Archives OF OTOLARYNGOLOGY

The Rehabilitation of the Laryngectomee

MURDOCK EQUEN, M.D., Atlanta

The laryngectomy without rehabilitation may serve only to prolong a miserable existence. Before operation one should begin to bolster the patient's morale. Even to the most stolid, the announcement that he has a cancer and therefore must part with his larynx comes as a severe shock. The unhappy man can hardly believe that without his voice box he will ever be able to talk to other people again, and too often he thinks at first that suicide is the best way out. Accordingly, when we tell him that laryngectomy is unavoidable we immediately introduce a laryngectomee who has mastered pharyngeal voice, being careful to pick out one with a cheerful, outgoing personality. The old hand is careful to explain to the patient that with practice he will be able to talk fluently and, though he will not be able to swim, he will almost certainly be able to return to his former occupation, provided it is not one involving heavy manual labor.

The laryngectomee goes on to explain to him that the quickest way for him to learn to talk again is with the electric larynx. With one of these he will be able to communicate with a considerable degree of fluency in a day or two, but the instrument is conspicuous, and there is no suggestion of a normal voice in the sound that comes out. Or he may try the reed type of artificial larynx; this takes longer for him to learn to talk understandably. These gadgets, however, have their disadvantages. To begin with, they are not inexpensive and their upkeep is a constant source of expense. They are conspicuous, and they have a way of getting out of order when the patient needs most to talk.

Another alternative is whispering. At best, the hearer must stay close to the patient and acquire a considerable amount of skill in lipreading to understand him. even more important, if he does much whispering before he learns to talk, it is almost impossible for the laryngectomee to learn to talk with a pharyngeal voice.

This leaves him a choice of two alternatives: the esophageal and the pharyngeal methods of speech. The esophageal voice requires him to be able to swallow large amounts of air. Anyone who can belch noisily can do this. Much has been said about teaching aerophagia to the patient while awaiting surgery. We oppose delay after the diagnosis of cancer has been established because we believe the situation urgently demands immediate operation. The esophageal voice, too, makes necessary frequent interruptions for the speaker to replenish his supply of intragastric air; he cannot speak his words trippingly on the tongue.

Though admittedly the pharyngeal voice is the hardest to master, it is by far the most satisfactory. True, this mode of speech is impossible when the larynx is in

Accepted for publication March 12, 1956.

From the Ponce de Leon Eye and Ear Infirmary.

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situ, but the sound is more natural than the other types, and there is nothing inelegant or offensive to the innocent bystander about it. With practice in deep breathing, the accessory muscles of respiration, necessary for him to get air into his pharynx, are strengthened, and deep breathing exercises should be continued.

The spirit optimism and comradeship that prevails among laryngectomees is marvelous. We have heard of the spes phthisica ever since we started the study of medicine, but this has nothing on the hope of the laryngectomized patient. We try to get two or three other men who have been operated upon to talk to the patient before operation, to let him know that his first friend is not the exception to the rule.

Regardless of the preoperative indoctrination, when a man wakes up after laryngectomy and realizes that he cannot make a sound in the oldfashioned way to which he is accustomed, again he receives a real shock. We therefore have his new friends drop by two or three times a day and greet him and encourage him.

As soon as the nasal catheter through which he has been fed is removed, we make the patient practice using the accessory muscles of inspiration to get air into his pharynx and try to get him to say short words that require little breath, such as "cat," "coke," "them," and "that." If he has too much difficulty in saying real words at first, he may begin with vowels only, and soon he can say, "hello." It encourages him a great deal to find that he can actually say words.

Ask the patient, "Do you want to talk? Do you have to talk?" If he has to talk and wants to talk, he will be able to talk.

In our experience the best teacher of speech for the person without a larynx is one who has mastered the art himself. An elderly patient who is growing deaf is not a good candidate for pharyngeal speech, though a deaf person who can read lips or who has a satisfactory hearing aid can be taught to speak. The semi-illiterate with a low I. Q. is not a very good candidate for artificial speech either. It requires application, patience, and some time to master pharyngeal speech, and considerable instruction and supervision are usually necessary lest the patient develop the habit of grimacing in his attempts to speak.

In Atlanta we are very proud of the Junior League School of Speech Correction. In this institution one of our former patients is employed full time as chief instructor. The Vocational Rehabilitation Division of the Georgia Department of Education supports these students of speech while they are in school. It is the surgeon's duty to take advantage of every possible means to sustain his patient's morale and make him economically independent as soon as possible.

The laryngectomees are gregarious persons. They get a great deal of satisfaction out of meeting with one another and helping the patients more recently operated on to make a similar recovery. It is desirable to have small clubs in every town of any size, with a state-wide organization. When they get together and talk over their problems they get a lot off their chests. They help each other quite a bit in discussing their affairs and they enjoy the social contacts too. At such a meeting, the surgeon who is a little incredulous that a man can talk without his larynx will be enlightened, and if he is in any doubt as to the best method of such a person's speaking, after hearing the various voices, he will be enthusiastically for the pharyngeal type.

In writing of persons who have encountered great sorrow and who have overcome handicaps and misfortune with courage and perseverance, the Reverend Dr. Pierce Harris of Atlanta provides me with a suitable conclusion:

"To me the finest thrill is to see some persons discover the great fact that with the chisel of courage, you can carve the cold stone of misfortune until there comes from its stubborn heart the shining face of happiness."

Chronic, Hypertrophic, Lingual Tonsillitis

NORMAN JESBERG, M.D., Los Angeles

"So the tongue also is a little member, and boasteth great things.
Behold, how much wood is kindled by how small a fire!"

—James 3:5

Diseases of the tongue are of interest to a wide variety of medical specialists, and of these the otolaryngologist is particularly concerned. The tongue, being a large, mobile, muscular organ covered with stratified squamous epithelium and having both an oral and a pharyngeal surface, is often inadequately examined. Recognized diseases of the tongue not infrequently are assigned to contiguous organs, such as the larynx, the palatine tonsil, and the mouth. With the exception of malignant lingual disease, there is relatively little attention paid to the tongue, and the paucity of information is particularly evident in regard to diseases of the lingual tonsil. After having encountered a number of cases of chronic, simple hypertrophy of the lingual tonsil, I hope that this report will help to stimulate interest in the subject.

The lingual components of Waldeyer's ring are flattened, disc-like collections of lymphatic tissue similar histologically to the palatine tonsil and occupying bilateral positions on the vertical surface of the tongue between the circumvallate papillae and the valleculae. They have crypts, secondary nodules, and capsules and are surrounded with an abundance of subcapsular mucus-secreting glands, particularly near the bases. In cases where there is sufficient hypertrophy, a frenular division produced by the median glossoepiglottic ligament may be seen separating them. Differing only in position from other oropharyngeal lymphtic tissue, the lingual tonsils are subject to the same diseases. As is pointed out by Thomson and Negus,[1] the lingual tonsils may be the seat of acute, follicular, lingual tonsillitis, parenchymatous lingual tonsillitis, or suppurative lingual tonsillitis (lingual quinsy). As a consequence of repeated acute inflammations, the lingual tonsils may undergo chronic hypertrophy, and it is with this occurrence that we will be particularly concerned.

As in many other phases of otolaryngology, we are indebted to Butlin * for important pioneer work on the subject of diseases of the tongue. The 1885 edition of his book is a mine of practical wisdom, especially on cancer of the tongue; however, he makes no reference to lingual tonsillitis. In 1900, he said, "Although I have seen a large number of tongue and throat cases, I have seen very few cases indeed of affection of the lingual tonsil, and still fewer which required active treatment. I have come to the conclusion that the importance of the subject has been somewhat exaggerated." Similarly, Fitzwilliams'[4] book on the tongue makes only passing reference to the lingual tonsil. There may be many today who share Butlin's view, but I believe that if we examine the tongue carefully we will find a significant number of cases of chronic, hypertrophic, lingual tonsillitis requiring surgical treatment.

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Presented as a candidate's thesis in partial fulfillment of the requirements for membership in the American Laryngological, Rhinological and Otological Society, Inc.

From the Eye and Ear Hospital, and the Department of Otolaryngology, University of Southern California.

* References 2 and 3.

Vesalius [5] in 1543 was the first to draw attention to the lingual tonsil, and the first full anatomical description was made by Kolliker [5] in 1852. In 1886, Swain [6] submitted one of the first modern reports on the anatomy and pathology of the lingual tonsils and diseases of the base of the tongue. Baron [7] in 1890 recognized the structural homology of the lymphatic elements of Waldeyer's ring. He described common symptoms associated with lingual tonsillitis, discussed the technique of indirect examination, and advocated destruction of the tissue with galvanocautery. The differential diagnosis of hypertrophic lingual tonsillitis was further described by Rosenberg,[8] in 1892. Foster [9] in 1928 recommended destruction of the lingual lymphatic tissue by "galvanocautery at a red heat," and Hollender [10] in 1932 advocated electrocoagulation. Putschkowsky [11] in 1935 reviewed the status of the surgical management of chronic hypertrophy of the lingual tonsils, and his ideas are in close agreement with the situation today. It is interesting to note that, in relation to the incidence of significant, chronic, lingual, tonsillar hypertrophy, he refers to Simanowsky's estimate of 22% of ambulatory patients. Liggett [12] in 1938 emphasized that lingual tonsillitis is the true diagnosis in many patients with "neuroses of the pharynx."

In recent years, Elfman,[13] in 1949, and Cracovaner,[14] in 1952, have described the importance of the lingual tonsils and the methods of handling chronic, hypertrophic, lingual tonsillitis. Most authors agree that severe chronic hypertrophy occurs more frequently than is realized and that the best method of dealing with these cases is by surgical dissection and snare. Hemorrhage should not be encountered, and if the laryngeal mirror is used, the pathologic tissue may be removed cleanly and completely.

From the available figures and from personal observations and communications during the past five years, I believe we should expect that chronic, lingual, tonsillar hypertrophy will be most frequently seen in young adults who have had a palatine tonsillectomy in childhood; that chronic lingual tonsillitis is commoner than is ordinarily supposed, and that even severe hypertrophy is not rare. We should be suspicious of this condition in patients complaining of a wide variety of vague throat symptoms who might easily be classified as cases of pharyngeal neurosis, a fact pointed out by Browne [5] at least 75 years ago.

Anatomy and Pathology

As a rule, the lingual tonsils are seen as scattered, separated, follicular aggregates on the vertical surface of the tongue, between the circumvallate papillae and valleculae. They have short, shallow crypts and are surrounded, especially near the bases, by mixed mucus-secreting glands, which were first described by Weber [15] in 1827. It is not known whether the duct openings of these glands are independent of the crypts. Parkinson [16] is of the opinion that the glands located near the superior pole of the palatine tonsils are in communication with the superior-pole crypt. In the case of the lingual tonsil, it is probable that the ducts are independent; however, lymphatic hypertrophy in this region could in either case cause obstructive mucus-retension cysts or minor salivary-gland adenitis. Kelemen [17] refers to these glands as "salivary glands of the capsule." It is most important not to confuse the lingual tonsil with the follicle-bearing portion of the plicae triangularis of the palatine tonsil, which may bridge the gap between the two separate collections of lymphatic tissue. A network of superficial and oftentimes engorged veins may frequently be seen in the valleculae and base of the tongue. It seems probable that these enlarged veins have little pathological significance; however, Browne [15] felt that they are frequently seen in con-

junction with chronic lingual tonsillitis.

Either as a result of repeated acute inflammations or as a manifestation of compensatory hypertrophy after palatine and pharyngeal tonsillectomy, the lingual tonsils may become more prominent than normal and in extreme cases may appear as in Figures 1 and 2. The hypertrophy may be so severe that indirect laryngoscopic visualization is not possible. In these cases, the crypts are much longer than is normal and may present the typical picture of acute follicular inflammation. Crypt occlusion may also occur, due to a combination of irregular hyperplasia of secondary nodules and caseous obstruction. These events may lead to crypt-occlusion cysts or intratonsillar abscesses. Lymphatic hypertrophy may also obstruct the ducts of the mucous glands and result in mucus-retension cysts, which may become secondarily infected.

Fig. 1.—A drawing with the pharynx opened from behind and with the soft palate removed to show the position of severely hypertrophied lingual tonsils.

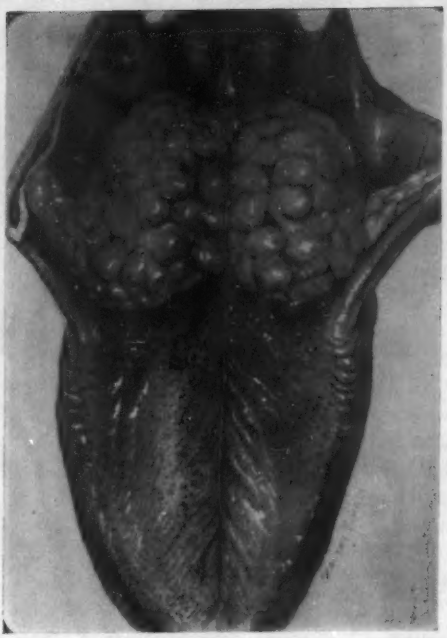

Fig. 2.—A drawing of the tongue showing the position and appearance of severely hypertrophied lingual tonsils.

Histopathologic findings are usually confined to cellular hyperplasia and to the typical cytological and humoral changes associated with acute and chronic inflammation. There is an increase in the size and number of the secondary nodules, the centers of which may show reticular hyperplasia, frequent mitoses, and disorganization. Surrounding the pale centers of the secondary nodules are found lymphocytic hyperplasia; numerous plasma cells; large, pale, phagocytic cells. The general and specific hyperplasia is fairly uniform and regular throughout the tonsil. The epithelized crypts may be seen to be deep and may show keratotic hyperplasia. Hyaline caseous material may be seen in the crypts and, occasionally, an acute inflammatory exudate containing polymorphonuclear leucocytes. The fibrous-tissue capsule is well developed in cases of marked enlargement, and there may also be hypertrophy

Fig. 3.—Low-power photomicrograph showing greatly increased thickness of the lingual tonsil due to hypertrophy of secondary nodules and lymphocytic hyperplasia. The crypts are much longer than is normal, and fibrous-tissue trabeculation can be seen passing through the enlarged lymphatic lobules.

Fig. 4.—Higher-power photomicrograph showing greatly hypertrophied secondary nodules, fibrous-tissue capsule, and subcapsular mucous glands.

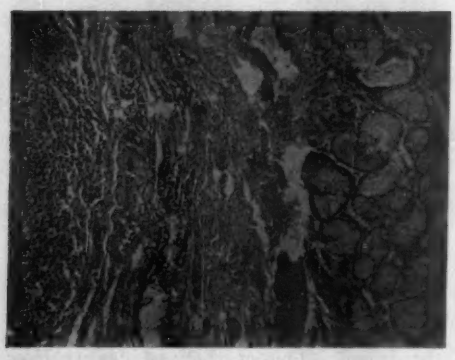

Fig. 5.—High-power photomicrograph showing mucous glands, capsule, and edge of a secondary nodule.

of the subcapsular mucus-secreting glands. Some of these findings are illustrated in the photomicrographs.

Most authors agree that chronic infection in the lingual tonsils may act as a focus of infection for iridocyclitis, glomerulonephritis, arthritis, and other inflammatory diseases.

Treatment

The treatment for lingual tonsillitis should be based on the same general principles employed in the treatment for diseases of the other oropharyngeal lymphatic tissues. During acute, nonspecific, follicular, inflammatory episodes appro-

priate antibiotics, throat irrigations, and sedatives are in order. When acute parenchymatous inflammation extends to involve the capsule and results in peritonsillar cellulitis or abscess, particular care must be taken in the case of the lingual tonsil. Lingual quinsy requires constant vigilance in order to protect the airway, as is illustrated in Case 4.

Repeated inflammatory episodes may cause hypertrophy of the lingual tonsil. For cases where the hypertrophy is moderate to severe, there is little argument that the best method of treatment is lingual tonsillectomy by sharp dissection and snare. The greater number of cases, however, have less enlargement and fewer symptoms, and their treatment is more difficult. For these patients many authors advise electrocoagulation. Swain [18] suggested radiation treatment, and I believe that it offers an equal chance of improvement without the danger of fibrosis, which may occur after electrocoagulation. Many cases may be properly cared for by medical attention during the acute episodes, with surgical removal reserved for the time when the lingual tonsils have enlarged to the point where they may be dealt with easily.

Although there are several automatic instruments for the removal of the lingual tonsils, such as the one described by Roe[19] and the Myles lingual tonsillotome, dissection removal is to be preferred. This method has been greatly neglected, probably due to an unwarranted fear of hemorrhage, however, when the hypertrophy is severe enough to require lingual tonsillectomy, the capsule is readily found, and surgical dissection and removal can be accomplished easily.

Surgical Technique

Since it is helpful to utilize indirect laryngoscopic procedures in lingual tonsillectomy, local anesthesia is preferable. A sufficient preoperative medication is essential; usually this consists of pentobarbital (Nembutal), 3 grains (0.2 gm.), one and one-half hours before surgery and morphine, ¼ grain (15 mg.), with scopolamine, 1/150 grain (0.4 mg.), one hour before surgery. A topical preparation of 10% cocaine is applied to the fauces, pharynx, and base of the tongue. If palatine remnants are present, local infiltration of 1% procaine hydrochloride (Novocain) around the fauces and a nerve bloc applied to the glossopharyngeal nerves give complete and adequate anesthesia. The patient should be in the sitting position with the head slightly forward, and after the local infiltration the palatine remnant is first dissected but not removed. A transverse incision is made in the mucous membrane of the tongue from the edge of the anterior faucial incision to the midline of the tongue posterior to the circumvallate papillae. A curved Allis clamp is then applied to the tonsil, and the tongue is depressed by an assistant. With the Allis forceps retracting the tonsil upward and backward, the capsule may then be found easily, and with a suitable dissection scissors (Dean's tonsil scissors) the tonsil may be removed from the musculature of the tongue. Soon after the initial incision, it is usually necessary for the assistant to hold the tongue out of the mouth to facilitate the dissection. When the tonsil has been loosened well down into the vallecula, a snare may be used to accomplish the final separation. At this point, careful inspection of the area by using a laryngeal mirror will be necessary. Additional trimming of follicular remnants at the base of the tongue may be accomplished only by indirect guidance. The opposite tonsil may then be removed in the same fashion.

Report of Cases

The following three cases are presented to illustrate some of the problems encountered in the surgical management of severe chronic hypertrophy of the lingual

tonsils. All the tonsils were examined histopathologically, and these findings have been previously summarized. All cases have been under observation for approximately five years postoperatively and have obtained satisfactory results.

CASE 1.—A 35-year-old white woman was first seen on July 20, 1950, and complained of frequent sore throats of several years' duration. She had had a tonsillectomy during childhood. During her most recent attack, in June, 1950, there occurred considerable hoarseness associated with difficulty in swallowing, pain around the base of the tongue, and a troublesome cough.

Examination of the ears, nose, and throat was negative except for diffuse, bilateral, soft, symmetrical enlargement of the lingual tonsils and small remnants of the palatine tonsils. The vocal cords and the perilaryngeal structures were normal. Lingual tonsillectomy was performed under local anesthesia July 22, 1950. The hypertrophic lymphatic tissue occupied the major portion of the vertical surface of the tongue. After removal each tonsil measured approximately 3 cm. in diameter and 1.7 cm. in thickness. The histopathological diagnosis was lymphoid hyperplasia of the lingual tonsils.

CASE 2.—A 21-year-old white woman was first seen Oct. 31, 1950, and complained of frequent sore throats of four years' duration. During acute episodes she had an irritating cough, difficulty in swallowing, and occasional hoarseness. She had had a tonsillectomy in childhood. At the first examination there was diffuse, acute, follicular exudate involving moderate-sized palatine remnants. There was extensive hypertrophy, with follicular exudate of both lingual tonsils. When the tongue was depressed, a huge collection of lymphatic tissue could be seen just behind the circumvallate papillae, traversing the entire tongue and extending into each palatine fossa. On indirect examination of the hypopharynx, extreme thickening and posterior protrusion of the lingual tonsils obscured entirely any visualization of the larynx proper. The mucous membrane over the arytenoid eminences could not be seen. This large mass of tissue filling the hypopharynx no doubt accounted for the peculiar muffling of the voice which she presented. A basal metabolism test was —5. The acute process was brought under control by the usual medical procedures, but after three weeks there was still no regression in the size of the lingual tonsils. Lingual tonsillectomy was performed under local anesthesia on Nov. 20 with the use of sharp dissection and snare. No undue bleeding was encountered; however, five hours later there was considerable bleeding, which was brought under prompt and complete control by a peroral injection of 1 cc. of 1:1000 epinephrine into the base of the tongue on each side. She was discharged from the hospital on Nov. 22 in good condition. After fixation each tonsil measured approximately $4.8 \times 2.2 \times 1.8$ cm. Histopathological diagnosis was follicular, lymphoid hyperplasia of the lingual tonsils.

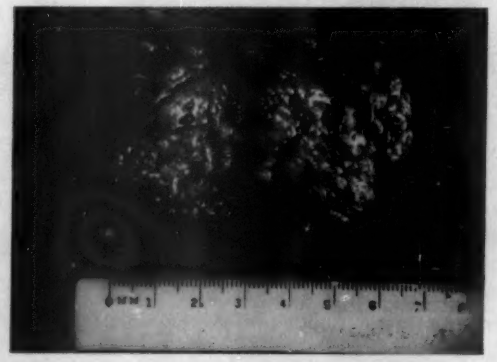

Fig. 6.—Photograph of lingual tonsils removed in Case 3.

CASE 3.—A 32-year-old white man was first seen Aug. 10, 1950, and complained of frequent sore throats with difficulty in swallowing of five years' duration. A recent urine examination had disclosed many red blood cells, and he was examined to determine if the tonsils could be acting as a focus of infection for glomerulonephritis. He had had a tonsillectomy during childhood. Examination of the ears, nose, sinuses, and teeth was negative. There were moderate-sized, bilateral, palatine remnants and diffuse, soft, bilateral hypertrophy of both lingual tonsils. Although the lingual tonsils were large, they did not obscure indirect visualization of the larynx, which was normal. Lingual tonsillectomy was advised but not performed until January, 1951, after he had had several episodes of acute sore throat. The tonsils when removed appeared as in Figure 6 and were approximately $4 \times 4 \times 1.4$ cm. and $3.5 \times 2.8 \times 1.1$ cm. in size. There was no unusual

bleeding, and he was discharged from the hospital in good condition the following day. The histopathological diagnosis was lymphoid hyperplasia of the lingual tonsils.

These cases demonstrate that severe hypertrophy of the lingual tonsils is associated with intermittent episodes of disabling sore throat, paroxysmal coughing, pain around the hyoid bone, hoarseness, and dysphagia. In extreme cases, the hypopharynx may be filled with tissue, so that the voice is muffled. The diagnosis may usually be established by direct and indirect examination and palpation. Although hemorrhage was encountered in one case, it was easily controlled, and in no other case has bleeding been more than trivial. With indirect laryngoscopic assistance and adequate anesthesia, the operation may be easily performed, although the postoperative discomfort is slightly greater, especially on swallowing, than for ordinary tonsillectomy.

Differential Diagnosis

There should be little difficulty in differentiating chronic benign hypertrophy of the lingual tonsils, due to nonspecific inflammation, from other lesions of the vertical surface of the tongue. As a rule, in fully developed cases such as are illustrated, the diffuse, symmetrical, soft, bilateral hypertrophy should be easily recognized by careful examination of the region. This would include direct and indirect inspection with the use of a tongue depressor and a laryngeal mirror and palpation with a gloved finger. With the proper use of the laryngeal mirror, there should be little need for x-ray examination of the hypopharynx, such as is described by Welin.[20]

In cases of slight or moderate hypertrophy, one may be at a loss to know whether the symptoms are in fact due to lingual tonsillitis, and it may be extremely difficult in these cases to make a definite diagnosis. In these cases and in the following situations, one must be careful to consider other lesions which may occur in this part of the tongue.

Inflammatory Diseases

In cases of acute inflammation, whether or not there is a corroborating history of foreign-body ingestion, one must consider the possibility of the presence of a small bone, bristle, or other foreign object, particularly if the inflammation is localized and not symmetrical. In an asymmetrical acute inflammation of progressing and severe proportions, one must consider the possibility of a perilingual abscess or lingual quinsy, which was first described by Craige † in 1834.

CASE 4.—A 31-year-old white woman was first seen Nov. 7, 1952, complaining of a sore throat with hoarseness, difficulty in swallowing, and difficult breathing of one week's duration. The temperature was 101.2 F, and she had had an unknown amount of penicillin by injection during the prior week.

Examination disclosed a large swelling of the base of the tongue on the left side, which completely obliterated the vallecula and pushed the epiglottis far to the right. The supraglottic airway was moderately obstructed, and nothing of the glottis could be seen. She was admitted to the hospital and started on penicillin and throat irrigations.

In several days' time, a hard, nonfluctuant mass developed in the region of the greater horn of the left side of the hyoid bone. The breathing and laryngeal obstruction became much worse, and the temperature rose to 104 F. On Nov. 10, 1952, a tracheotomy was performed, followed by external incision and drainage of the perilingual cellulitis. At operation, although wide exposure was obtained at the base of the tongue, no pus was encountered, but by the next day profuse discharge was evident. Culture from the wound revealed a viridans Streptococcus which was very sensitive to oxytetracycline (Terramycin) and chlortetracycline (Aureomycin) but resistant to penicillin. The appropriate antibiotic was then used, and there was prompt and complete recovery.

In acute, subacute, or chronic lingual tonsillitis, one must constantly keep in mind the possibility of a specific inflammation. Probably the most important specific inflammation to be considered is tuberculous hypopharyngitis, as in the

† Reference 2, p. 46.

following cases, which remained unrecognized for some length of time.

CASE 5.—A 57-year-old white man was first seen Nov. 28, 1949, and complained of an intermittent sore throat of five months' duration, without weight loss or other symptoms. Examination showed diffuse injection of the entire mesopharynx and hypopharynx, with particular injection and slight enlargement of the lingual tonsils and anterior surface of the epiglottis. The larynx proper was completely normal. Chest x-rays did not appear abnormal, and a barium swallow showed normal function of the deglutition mechanism. Serological tests for syphilis were negative.

The indolent injection and enlargement of the lingual tonsils continued, and on Feb. 8, 1950, a biopsy specimen was taken from the left vallecula and lingual tonsil. Histopathological examination revealed chronic tuberculous inflammation, with acid-fast organisms present in the tissue. Repeat chest x-rays were taken on Feb. 18, and they showed a soft infiltration in both upper lobes without cavitation. He was referred to a phthisiologist and, with streptomycin sulfate treatment, recovered completely.

Fig. 7.—A composite laryngoscopic picture showing small crypt-occlusion cysts and a large mucus-retention cyst near the right lateral glossoepiglottic fold.

Other specific inflammations to be constantly kept in mind are syphilis and various mycotic affections, such as actinomycosis, coccidioidomycosis, blastomycosis, and moniliasis. Also to be considered are constitutional disorders produced by nutritional deficiencies, which may lead to a chronic inflammatory disease of the tongue and hypopharynx.

Cysts

When one considers the anatomy of the lingual tonsils and that, particularly near the valleculae, there is an abundance of subcapsular mixed glands, it is easy to visualize the pathogenesis and sequential changes leading to the appearance of mucus-retention cysts. These cysts should present little difficulty in differential diagnosis, but they may be associated with a coexisting diffuse lymphatic hypertrophy of the lingual tonsils. A thyroglossal cyst may rarely occupy a position entirely in the base of the tongue.

Benign Tumors

Benign tumors involving the base of the tongue may be confused with hypertrophy of the lingual tonsils. The presence of a lingual thyroid at the base of the tongue is perhaps the most important innocent space-occupying lesion to distinguish from simple inflammatory hypertrophy. The general position of the tumor and its consistency to palpation should help a great deal; however, one may be required to resort to a radioactive-iodine concentration test, such as is described by Richardson and Lineback.[21] Reports of hemorrhage encountered during the treatment of lingual thyroid growths surgically have perhaps prejudiced surgeons against any surgical treatment for lesions in this region. Butlin's accounts in this regard are to be noted. As a rule, lingual tonsillectomy, when indicated, may be accomplished without troublesome bleeding of any sort. Adenomas and mixed salivary-gland tumors may also occur

Fig. 8.—A photomicrograph of the wall of a mucus-retention cyst in which there is a notable absence of secondary infection.

together with non-neoplastic, space-occupying, subepithelial tumefactions, such as sarcoid and amyloid deposits. In any doubtful case, of course, biopsy, lateral x-ray of the neck, barium swallow, and radioactive-iodine tests are indicated.

Malignant Tumors

It is usually difficult to confuse carcinoma of the base of the tongue with this condition. The usual inspection and palpation examination procedures will reveal an ulcerated surface and secondary infection, causing fetid odor. Nonulcerating carcinoma and lymphoepithelioma may be difficult to distinguish without biopsy, which should, of course, be performed if there is suspicion of a malignant epithelial growth. Perhaps the greatest perspicacity is required in differentiating benign lymphatic hyperplasia of the lingual tonsil from malignant mesothelial lesions, particularly one of the group of malignant lymphomas. Giant follicular lymphoma should be particularly mentioned in this respect, and it may be impossible to make the differentiation, even on histological examination. The usual case of malignant lymphoma, such as the following, should present no great diagnostic difficulties.

Case 6.—A 66-year-old white woman was first seen on Aug. 11, 1953, and complained of a stuffy right ear of one month's duration following a respiratory infection. She had had intermittent sore throats during the past year and had lost 15 lb. She had noticed hard, painless, and nontender lumps in both sides of the neck for one month. Tonsillectomy had been performed in 1945.

Examination showed that there was huge, diffuse, bilateral enlargement of both lingual tonsils, which were hard to palpation. The lymphatic mass extended into the lateral walls of the hypopharynx. The epipharynx and mesopharynx were normal, except for slight enlargement of the lateral pharyngeal bands. The fauces were clean. There were multiple, large, hard, bilateral, confluent, and fixed tumefactions in both sides of the neck and in both axillae. The immediate clinical impression was malignant lymphoma of the lingual tonsils with general involvement of the cervical and axillary lymph nodes. A biopsy specimen was taken from

Fig. 9.—A photomicrograph of a crypt-occlusion cyst showing keratosis of the epithelium and chronic inflammation and hypertrophy of the subepithelial lymphatic tissue.

the right lingual tonsil. Histological report was malignant lymphoma (reticulum-cell sarcoma). A chest x-ray was normal; and a blood examination showed a mild hypochromic anemia, a white cell count of 10,700, and a normal differential. She died on Sept. 9, 1953.

In view of the variety of conditions which may cause symptoms similar to chronic lingual tonsillitis, it appears wise to keep an open mind to all diagnostic possibilities. The utilization of x-rays, cultures, smears, sputum examinations, serologic tests, iodine concentration tests, basal metabolism tests, and biopsies should be employed when necessary; however, an accurate diagnosis may very frequently be made by proper clinical examination. An awareness of the possibility of lingual tonsillitis is necessary, since with mirror laryngoscopy this area of the tongue may be neglected in efforts to scrutinize the larynx proper.

Summary

The importance in clinical otolaryngology of chronic lingual tonsillitis is assessed, and the methods of diagnosis and treatment of this entity are outlined. I believe that the actual importance of this condition lies somewhere between the view expressed by Butlin and the position of those who would charge all chronic vague throat complaints to inflammation of the lingual tonsil. The cases of minor involvement are open to great argument, but the cases of moderate and severe hypertrophy, such as are described, must be cared for.

Conclusions

1. Chronic lingual tonsillitis is commoner than is ordinarily supposed.

2. Severe hypertrophy occurs with sufficient frequency to justify the presentation of the subject in residency training programs.

3. Careful examination of the patient and employment of necessary diagnostic aids should establish an accurate diagnosis.

4. Surgical removal, by dissection and snare, of greatly hypertrophied lingual tonsils is easily performed, and hemorrhage is rarely encountered.

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Harelip-Nose Revision

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The surgical management of the harelip nose cannot be discussed without passing mention of the associated lip defect. On the basis of our experience we are convinced that the degree of the deformity in the adult harelip nose is due more to the primary surgery than to the embryologic fault. It is a sad reflection for a surgeon to feel that he might have made the lot of these unfortunates more bearable had he resisted the importunity of the parents and his own temptation to produce in the harelip infant a spectacular result. The surgical consensus is expressed by LeMesurier [1]: "The operation is done almost entirely for the sake of appearance and should be done with the object of making both the lip and nose as nearly normal in appearance as possible at the one operation."

We wonder whether one who operates with the above objective would not alter his opinion, were the final revision to be his personal responsibility when the patient has reached maturity.

In the infant the tissues are small and fragile. Even a slight sacrifice of material represents a considerable loss later in life. Likewise, an error in technique will be magnified many times with the development of the face. That outstanding surgeon Kazanjian [2] has this to say: "The excision of a piece of skin as small as one quarter of an inch in length is equal to half an inch in length in adult life." Blair,[3] in one of his classic contributions to plastic surgery, observes, "A sixty-fourth of an inch one way or the other will make a noticeable difference."

To obtain a cosmetic result demands wide stripping of the soft parts, extensive V-excision, or the use of complicated geometric flaps—all of which is likely to damage the growth potential and manifest itself in later life by nasal asymmetries, recession of the maxilla, malocclusion, and retrusion of the upper lip, giving the characteristic "dish-faced" appearance. According to Slaughter and Brodie,[4] in their recent research on facial clefts, "Surgery can and does inhibit normal growth. This interference is directly proportional to the amount of injury to growth centers and to diminution of blood supply to the parts concerned." The same writers [4] believe that growth in congenital deformities is similar to that in normal tissues, each part of the face enlarging in "just the proper direction and amount to maintain the stabilization of the whole" (Fig. 1). Since the introduction of the Broadbent-Bolton * cephalometer in 1931, it is possible to measure accurately the growth patterns of the head by the superimposition of a series of consecutive cephalometric roentgenograph tracings. Graber,† employing this method in cases operated and unoperated on, has this to say: "The evidence afforded by these comparisons would seem convincing proof of the damaging effects which can follow operations in early life, if tissues which should be free to expand and develop are confined and restricted in a vice of heavy unyielding suture material and subsequent scar-tissue formation."

Despite considerable evidence against the advisability of surgery in infants, the

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* References 5 and 6.
† References 7 and 8.

Fig. 1.—Harelip nose unoperated on, each part of face enlarging in "just the proper direction and amount to maintain the stabilization of the whole." Such a case offers no problem. (Courtesy Dr. Rambo.)

consensus is to repair the deformity as soon as the patient's condition permits, certainly before the bones have lost their pliability. Some intervene within 48 hours of birth. Others prefer to wait until the child has regained its birth weight, and still others delay surgery until the infant weights 10 lb.—i.e., two or three months. The claims made for such early closure are many. Some can be briefly dismissed—e.g., "The operation facilitates feeding." With modern harelip feeders adequate nutrition can always be obtained. "In infancy the risk of life is under ordinary conditions very trivial indeed."[9] It would be interesting to have some definite information as to the shock-resistance and healing qualities of infants as compared with those in older children. We have been unable to find such statistics.

A reason that cannot be so easily dismissed is the claim that early closure exerts a beneficial effect on the future development of the parts. It is assumed that in a normal infant the counterpressure of the lip, tongue, and cheek molds the alveolar process. Since in a cleft lip the labial forces are lacking, the tongue tends to push forward the alveolar arch, while the buccal forces constrict the lateral segments, resulting in a cross bite. It is claimed that not only does operation restore the labial forces but in complete clefts the elastic tension of the repaired lip favors approximation of the alveolus. When done late, repositioning of the premaxilla proves more difficult, owing to the decreased pliability of the bone. Huffman and Lierle[10] state: "We are in complete agreement with Vaughan's belief that normal processes of growth and function tend to develop tissues after they are placed in correct anatomic relationship."

Assuming the beneficial effect of the

elastic pressure of the reconstructed lip, why not limit the initial surgery to the restoration of this function and avoid the trauma and sacrifice of tissue necessary to obtain a cosmetic result? Although such repair leaves much to be desired from an esthetic standpoint, our experience shows that it would offer the best prospects of a satisfactory final appearance after the adult facies has developed (Fig. 2).

Theoretically, the policy of perfection would indicate the advisability of waiting until the tissues are fully matured

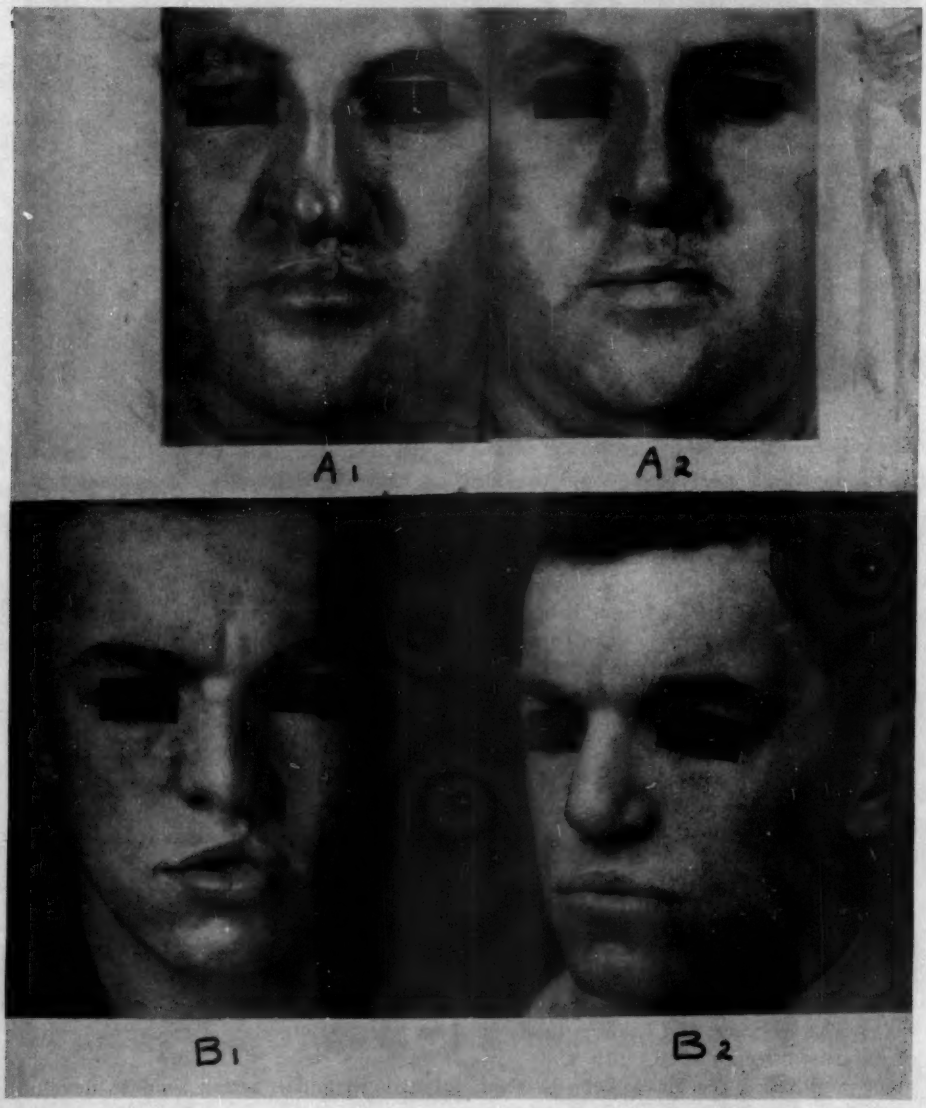

Fig. 2.—Repair of harelip nose: *A1*, result of physiologic adjustment and approximation in infancy, with no attempt at cosmetic result. *A2*, result of revision. Note absence of stigma of harelip deformity. *B1*, result of closure in infancy, with cosmetic objective. *B2*, result of revision. Note stigma of harelip deformity, scaphoid facies, and nasal disfigurement.

and the patient's coöperation is obtainable, to permit of careful, leisurely repair. Practically, however, one must consider the reasonable demands of the parents, for a facial deformity in the newborn is a devastating experience for them. Add to this the stigma of heredity, and the calamity assumes catastrophic proportions. Furthermore, one cannot lose sight of the complexes that are sure to arise from the ridicule and mimicry of the child's companions.

Consultation with a psychiatrist, to weigh the psychologic damage inflicted by postponement of operation against the possible injury to growth centers incurred in early intervention, would greatly benefit the surgeon in making a decision as to the optimal time for repair. Moreover, coöperation on the part of the parents can usually be obtained by a frank and tactful explanation that although an immediate cosmetic result is possible, the longer the surgery is delayed, the better will be the ultimate outcome.

A review of the voluminous literature shows that there has been no new principle in theory developed in this field in over a century. Whatever recent advances made were merely in the refinement of technique and instruments—all for the purpose of obtaining some additional cosmetic benefit. What is needed is revised concepts arising from a reorientation of thinking. A better knowledge of embryology would help. For instance, does the protrusion of the premaxilla represent the normal extension of the alveolus, or is it merely apparent, due to a recession of the maxilla, or is it a hypertrophy of its structure? Is the prolabium a part of the columella, the lip, or both? Should the surgery be directed toward the repair of nonunion of normally developed tissues or to that of deficiency or both? Is the condition hereditary or an inherited predisposition? What part is played by genetic and environmental factors? Can the dental art evolve a prosthesis that would restore the elastic tension of the lip and at the same time conceal the deformity, thus eliminating possible surgical damage to the growth

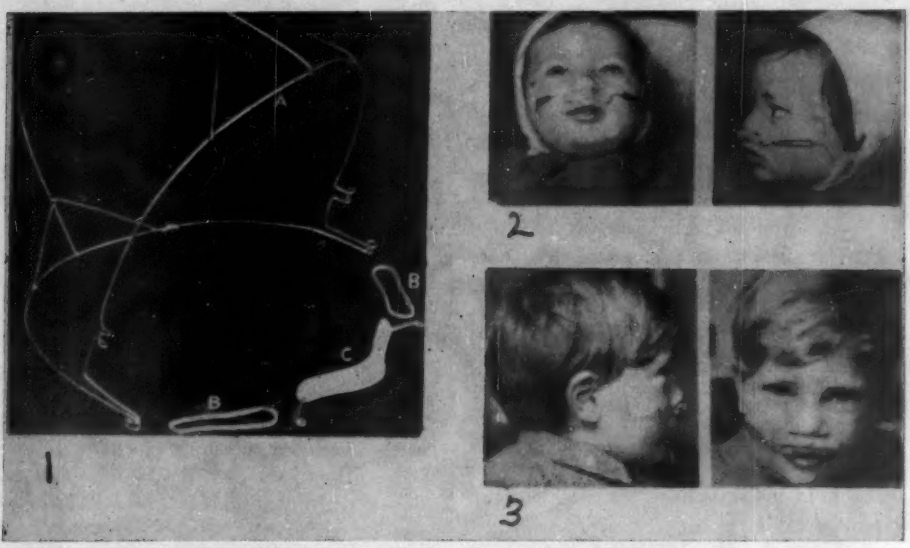

Fig. 3.—McNeil's prosthesis: (1) Components of appliance: *A*, stainless-steel harness; *B*, rubber bands; *C*, labial attachment. (2) Frontal and lateral views of patient at 10 months. (3) Frontal and lateral views of patient at 2½ years. (Reproduced from McNeil: Oral and Facial Deformity, Sir Isaac Pitman & Sons, Ltd.)

potential? McNeil,[11] Senior Lecturer at the University of Glasgow, has devised a prosthesis for the retropositioning of the premaxilla and the expansion of the dental arch (Fig. 3). How much of the deformity in the adult is due to postnatal developmental faults and how much to the trauma of the initial surgery? Why is it that the more satisfactory the cosmetic result in the infant, the more pronounced the deformity is likely to be at puberty? Why will a surgeon who would unhesitatingly delay a rhinoplasty until the parts have fully developed allow himself to be persuaded into a harelip-nose operation on the infant? Concerning all these questions there has been too much speculation and too little knowledge.

Management

The problem in adult harelip revision is to remove the stigma of heredity, which for the patient's peace of mind is far more important than the deformity. Generally speaking, any procedure limited to the nasal pyramid will leave much to be desired.[12] No amount of manipulation of the bone, cartilages, or soft issue will camouflage an underdeveloped maxilla. To correct the lack of projection of the nose merely by building up the dorsum improves the nasal appearance but exaggerates the associated "dish-faced" deformity. Raising the foundation, however, frequently eliminates both defects at the same time.

To remove the stigma of heredity, it will be necessary (1) to correct the scaphoid facies and restore the nasal foundation, (2) readjust the nasal structures (functionally and cosmetically), and (3) to reconstruct the lip to harmonize with the repaired nose. No detailed technique will be given, on the assumption that one who operates on this deformity is already conversant with rhinoplastic procedures.

1. Correction of Scaphoid Facies and Restoration of Nasal Foundation

Clinical Appearance.—The maxillary, nasal, ethmoid, and malar bones are underdeveloped and displaced backward. Because of either the scar-tissue pull, damage to the growth potential, or pressure of the tight lip following the primary operation, the upper jaw has come to lie inside the lower. The teeth are stunted, displaced, and carious. The relative prominence of the forehead, the recession of the middle of the face, and the prognathic mandible give the person the characteristic "dish-faced" appearance of the harelip patient.

Operative Procedure.—A graft is used to correct the scaphoid facies and raise the nasal foundation. To ensure precision in shaping, a plaster cast of the face is made. On this the deformity is built out in Stent. The model is sterilized with the instruments at the time of the operation.

A. Preparation of Bed for Reception of Graft: The approach will depend on the site and depth of the scapha and the condition of the lip. If the lip does not require reconstruction, an incision is made along the upper buccal sulcus, from molar to molar (Fig. 4). If the lip must be taken apart either for cosmetic reasons or because it is tied down to alveolus by scar tissue, it will furnish a convenient avenue. If the retrusion of the maxilla is limited to the bone around the piriform opening, access is obtained through the transfixion incision in the membrane septum or by separation of the alae at their labial junctions. Through one of these incisions the soft tissues over the maxilla are elevated in the plane above the periosteum (Fig. 5). The mucosa is separated from the floor of the nose and from either side of the septum. With a chisel the nasal spine and septum are divided along the vomerine ridge. The nose is completely mobilized and the apex of the pyramid separated from its attachment to the frontal bone. Bleeding

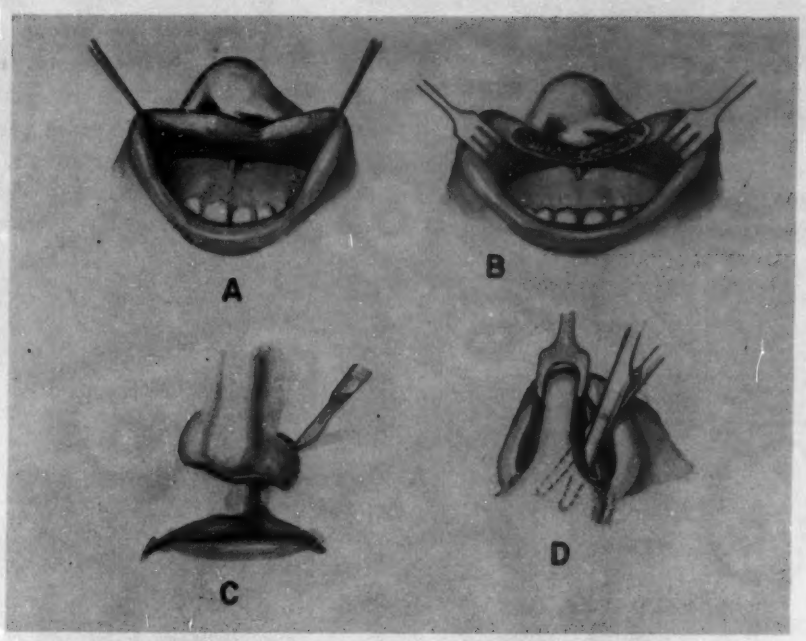

Fig. 4.—Avenues of approach for restoration of nasal foundation: *A*, incision made along upper buccal sulcus, from molar to molar. *B*, lip scar excised. *C*, alarfacial incision. *D*, transfixion incision.

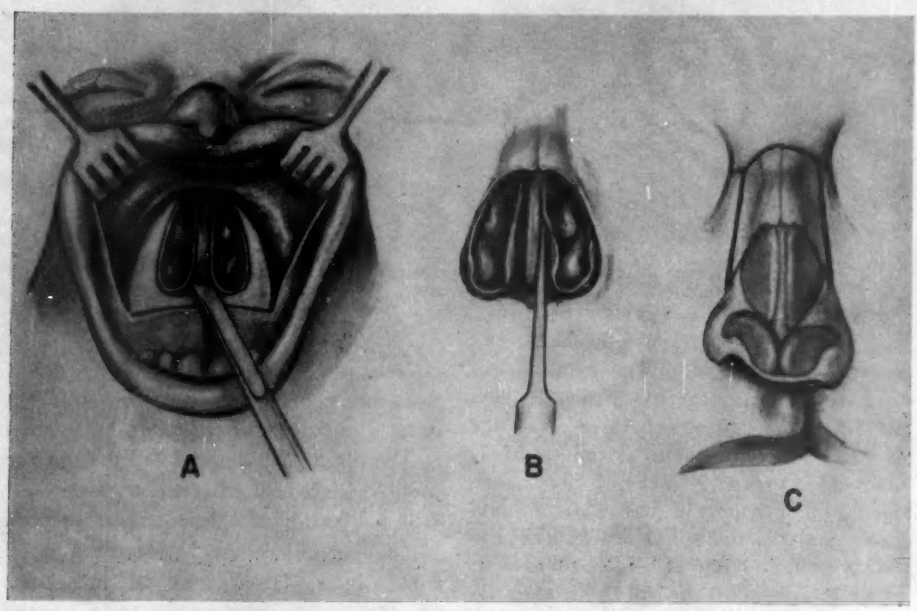

Fig. 5.—Preparation of bed: *A*, soft tissues raised in plane above periosteum. Mucosa of nasal floor and septum elevated. Nasal spine and septum cut through with chisel. *B*, diagram showing elevation of membranes on floor of nose and septum. *C*, nasal pyramid mobilized.

is slight and can easily be controlled by pressure over a pad of gauze wrung out of hot saline solution and placed between the soft tissues and skeleton.

If the premaxilla is loose and functionless, it is resected, the lip being subsequently brought forward by means of a prosthesis (provided the lip is not too tight). If fixed and protruding, it is chiseled down to overcome the undue projection of the lip. If the teeth of the premaxilla are useless and prevent the fitting of an efficient prosthesis, they are extracted. Here it may be necessary to create a new gingivolabial sulcus with

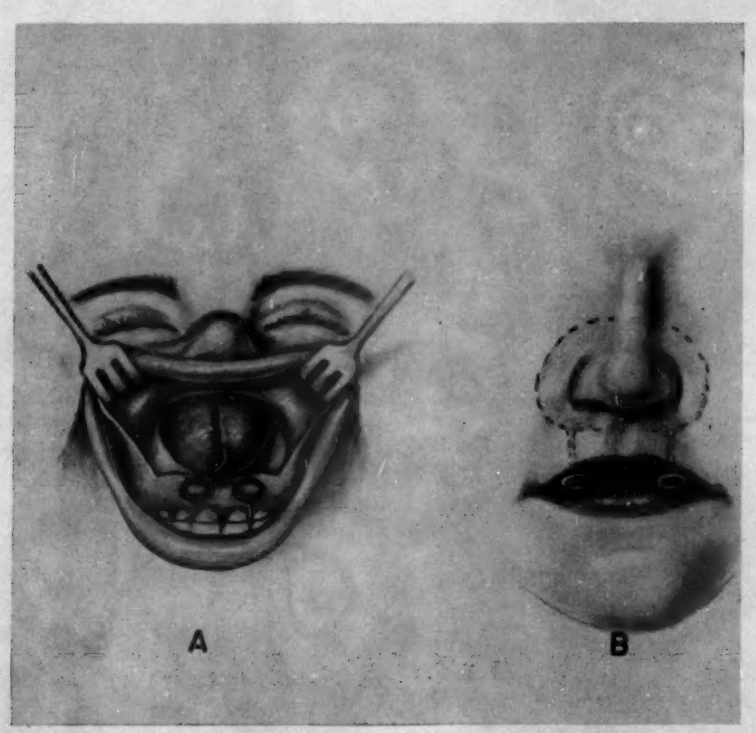

Fig. 6.—Formation of skin-lined cavity for introduction of flange attached to denture: *A*, wire carrying tray for Stent, to support graft-covered mold. *B*, diagrammatic representation of graft in place.

a skin graft (Fig. 6). The technique is well described in the literature. Briefly, the lip having been separated from the alveolus, an impression of the cavity is made as follows: A piece of Stent softened in hot water is placed on a previously constructed splint, introduced into the pocket and allowed to harden. The mold attached to the splint is then removed, and a split-skin graft is wrapped around it, raw surface out. The graft-covered mold is reinserted into the pocket and immobilized by fixing the splint to wire or metal bands previously attached to the teeth. At the end of 10 days the mold is removed, whereupon the pocket will be found epithelized. To eliminate the danger of subsequent contraction, the mold is replaced with a prosthesis equipped with teeth and so shaped as to carry the lip forward.

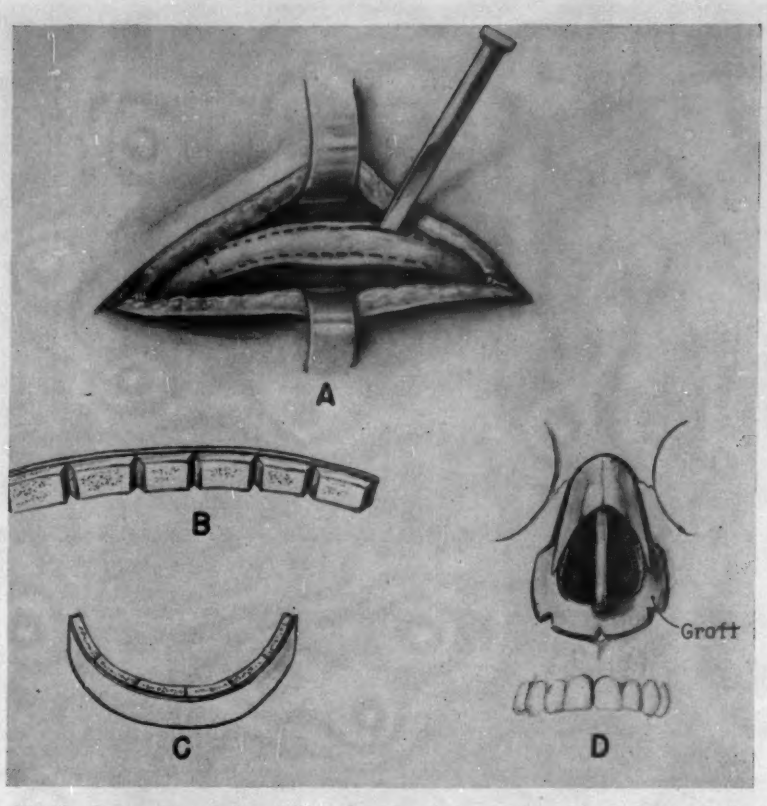

Fig. 7.—Procurement and modeling of graft: *A*, previously prepared pattern outlined on crest of ilium, and graft removed with chisel. *B* and *C*, graft modeled to pattern, and wedges excised from cancellous surface, to secure desired shape. *D*, graft placed over retruded maxilla and slide beneath previously mobilized pyramid for distance of 2-3 mm.

B. Procurement and Modeling of Graft (Fig. 7): The previously prepared pattern is outlined on the crest of the ilium with a scalpel. With a thin broad chisel directed horizontally the bone is penetrated to a depth of 3-4 mm. and removed, together with its periosteum. The graft is modeled to pattern, and to obtain additional flexibility wedges are excised from the cancellous surface.

C. Emplacement of Graft (Fig. 7D): The graft is placed over the retruded maxilla and slid beneath the previously mobilized nasal pyramid and septum for a distance usually of 2-3 mm. The advantages of the osteoperiosteal graft are that it can be procured easily, requires no special instrument, leaves no residual deformity, and permits free manipulation. The incision of approach is closed in the usual manner.

If the recession is limited to the vicinity of the piriform opening, it is built up with bone chips introduced into a pocket made for the purpose (Fig. 8).

Occasionally, to supplement the correction of the scaphoid facies, it may be necessary to build out a part with fascia grafts from the thigh or dermal grafts from the abdomen. These are introduced through a preauricular incision similar to the one used in the face-lift operation [13] (Fig. 9).

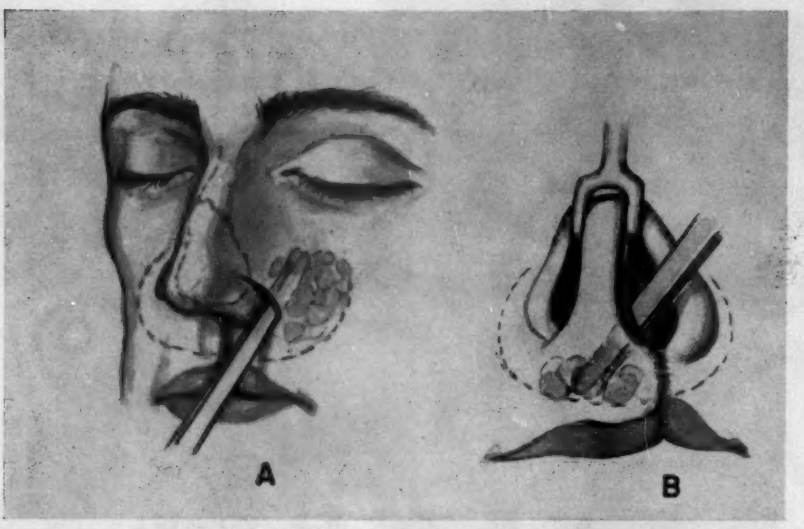

Fig. 8.—Introduction of bone chips: *A*, through alarfacial incision. *B*, through septocolumellar incision.

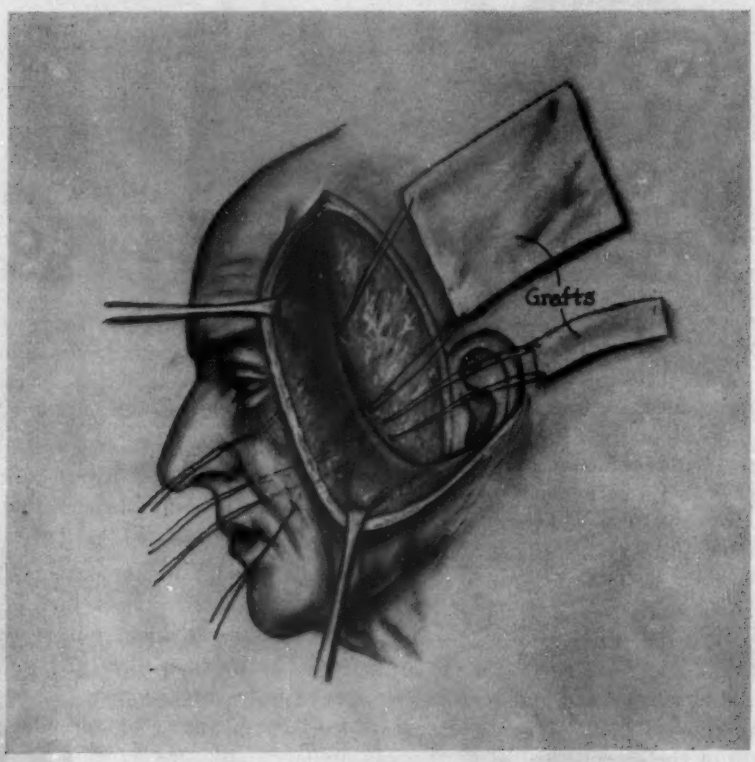

Fig. 9.—Supplementing correction of scaphoid facies with fascia graft from thigh or dermal graft from abdomen.

Since the prognathism of the lower jaw is more apparent than real, the building-up of the maxilla will usually eliminate the disproportion.

obstruction, the whole nose being tilted to a side.

The most marked deformity is in the lower cartilaginous vault. The whole

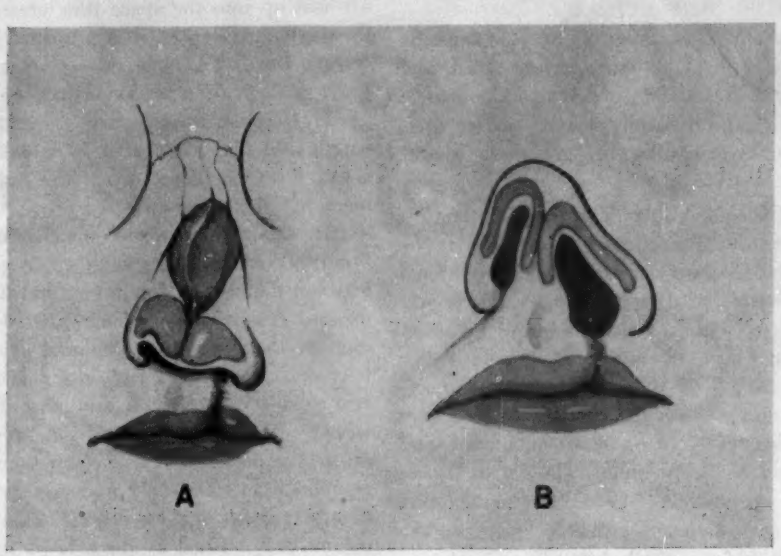

Fig. 10.—Diagrammatic representation of nasal deformity: *A*, nasal bones and upper lateral cartilages buckled and shifted to a side. Septum angulated, *C*- and S-shaped. *B*, basal view, showing lower lateral cartilages buckled and rotated, intercrural angle widened, nasal tip flattened, and columella oblique.

2. Readjustment of Nasal Structures

Clinical Appearance.—The nasal distortion is due largely to a change in the relationship of the soft tissue and cartilage to the bone (Fig. 10). To a slighter degree it results from the bony displacement. (In a cleft lip without alveolar involvement the displacement is little less extensive than when there is an associated cleft of the alveolus.) The nasal bones are asymmetrical. There is a simulated hump, because the root of the nose is carried forward by the frontal and nasal bones, while the lower half is tied down by scar tissue to the underdeveloped upper jaw. The septum is S- or C-shaped and buckled more toward the intact side, displacing the upper lateral cartilages, with bilateral nasal lobule is shifted away from the midline. It is as if it had been taken between thumb and forefinger, compressed and rotated downward, laterally, and backward. The ala on the affected side, instead of curving inward to form a more or less circular nostril, is flattened out, sometimes in a straight line with the cheek. The affected nostril is situated dorsally, with its axis transverse. The columella is dragged over to the unaffected side and lies obliquely across the base of the nose, being lower on the cleft side. The lower lateral cartilages are rotated one on the other. The vertical distance between the tip of the nose and the vermilion border on the cleft side is shorter than on the intact side.

In double harelip the position of the nasal tip is usually satisfactory; but be-

cause of an outward stretching of the lower lateral cartilages across the cleft, the nostrils are wide. The size of the nasal cavity is diminished, because the palate, instead of being Romanesque, is Gothic in shape.

Operative Procedure.—The nose must be separated in all its parts, reassembled, and placed in a dressing, which acts like a mold in which the tissues heal in a manner similar to the congealing of gelatin in a container.[15]

1. Osseous Vault: The osseous vault is considerably altered after the raising of the foundation and may require some additional reconstruction. If the nasal pyramid is still depressed, despite the elevation of its foundation, it is built up with a cancellous iliac bone graft.[16] If the nose is unduly projecting, the excess is cut away. If it is deflected, the walls are equalized, mobilized, and brought to the midline. These two procedures are best done before the elevation of the foundation, in order to maintain the stability of the nasal skeleton.

2. Upper Cartilaginous Vault: The upper cartilaginous vault is treated similarly. The septum is the most important element in the reconstruction and, if not already attended to in the repair of the recessed maxilla, will require considerable sectioning and repositioning, not only for cosmetic but also for functional reasons. The upper lateral cartilages are separated from their attachment to the septum and maxilla and sutured into a normal position.

3. Lower Cartilaginous Vault: The lower lateral cartilages are freed from their skin covering and the angles cut through in the usual manner. The alae are separated from the cheek by an incision in the alarfacial junction.

(A) Reconstruction of columella. There are four steps in the reconstruction of the columella.

(1) Reconstruction of columellar-labial angle. The columellar-labial angle is repaired at the time that the recessed foundation is elevated. Usually some additional modeling will be required. If the angle is too low, it is raised by an excision of a portion of the osteoperiosteal graft. The parts are slid up into the space thus created. If the angle is retracted, it is projected by the introduction of a bone or septal cartilage graft through the transfixion incision.

(2) Reconstruction of columellar length. As the columella is usually too short, it is lengthened by a V-Y advancement of labial tissue.

(3) Reconstruction of columellar inclination (shortening). The columella is grasped between thumb and forefinger, and with an upward (cephalad) and backward (dorsad) motion the lower cartilaginous vault is telescoped over the upper until the desired relationship between lip and nares is obtained. With the aponeurosis between the upper and lower lateral cartilages cut, this position is automatically maintained by the contraction of the overlying skin. The columella is pushed to one side of the septum. A scratch is made at this level, and the part below is excised.

(4) Reconstruction of columellar projection. There is usually insufficient septal development to give prominence to the columella. The correction will require the introduction of a batten into a pocket made in the columella (Fig. 11). Before the fixation of the batten, the two sides of the columella are grasped between thumb and forefinger, so as to swing the short side upward to the level of the long side. The parts are maintained in the corrected position by two mattress sutures.

(B) Reconstruction of basal triangle (dorsal wall: base of triangle). If the alae project beyond two imaginary parallel perpendiculars dropped from the inner canthi, the base of the triangle is too wide and must be reduced to bring the alae within these lines. The technique has been described elsewhere.[17] Briefly, through the alarfacial incisions the base of the nose is separated from its attachment to the bone.

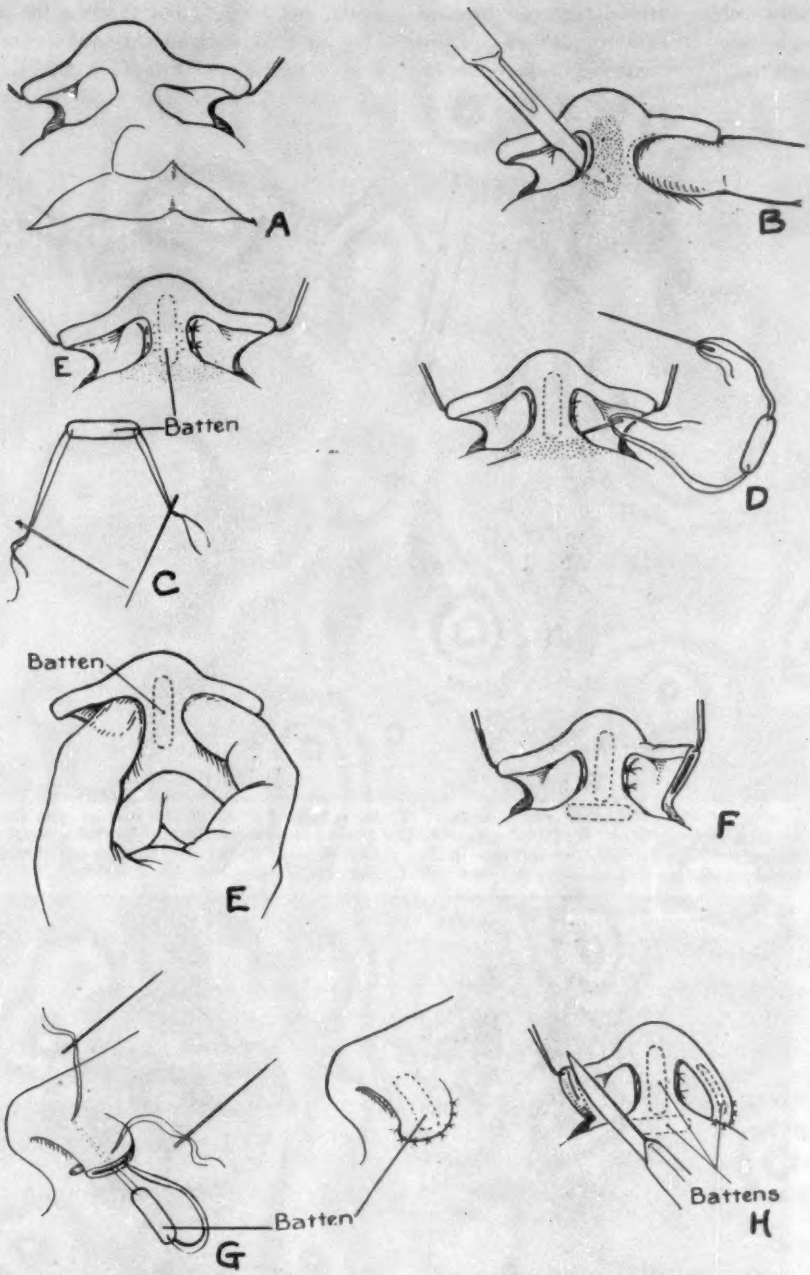

Fig. 11.—Reconstruction of columellar projection: *A*, alae separated from cheeks along alarfacial grooves. *B*, pocket made in columella. *C* and *D*, method of introducing cartilage batten. *E*, short side swung to level of long side by twisting motion. *F*, parts maintained in corrected position by two mattress sutures passed through batten. Additional batten inserted at septolabial angle. *G*, alar margin stiffened by additional graft. *H*, normal ala made to match corrected side.

An absorbable surgical suture threaded through two straight needles is passed through the tissues, entered through one incision, and brought out through the other. The suture is tightened, to secure the desired width, and tied (Fig. 12*C*). The

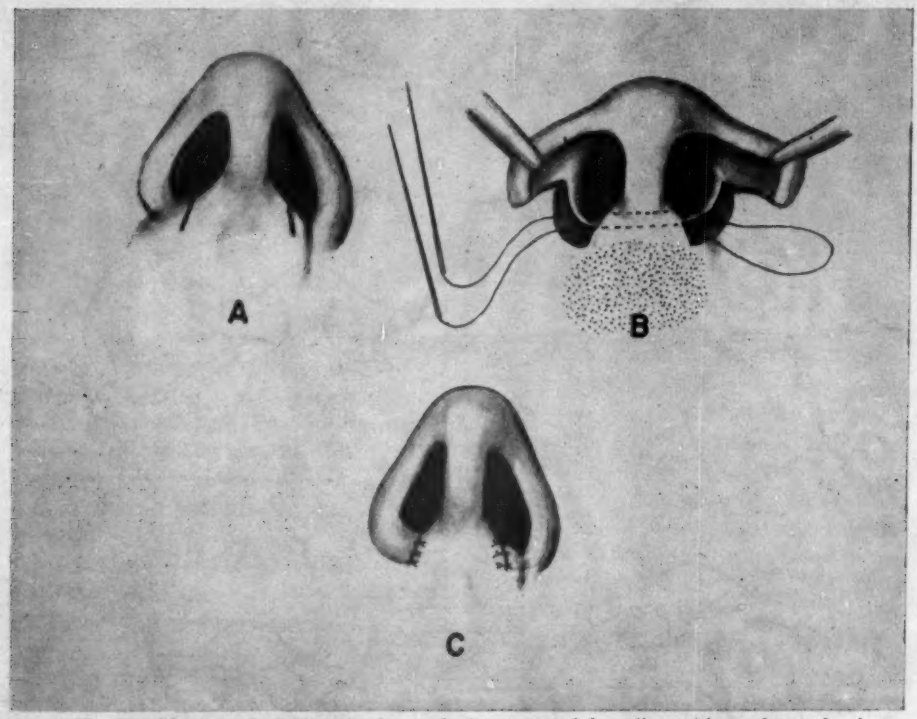

Fig. 12.—Methods of altering alar base: *A*, alae separated from lip, and base of nose freed from underlying bone. *B*, dotted area indicates amount of undermining. Absorbable surgical suture threaded through two straight needles passed through tissues and brought out through incisions. Suture tied, to secure proper width. *C*, alae reattached.

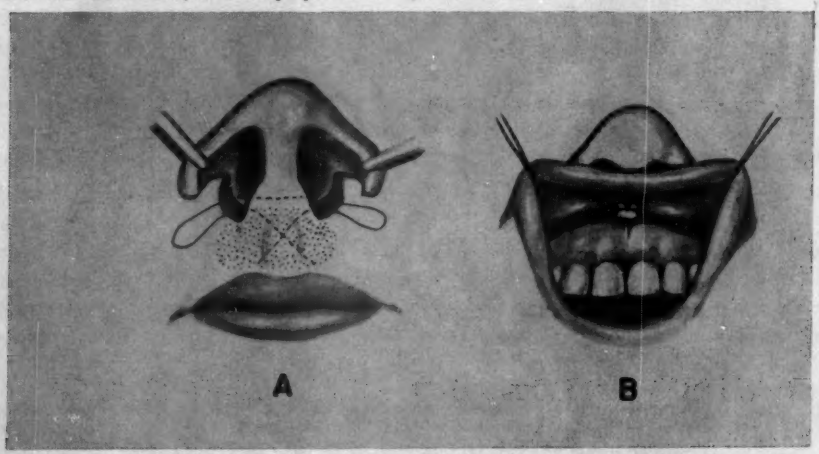

Fig. 13.—Method of altering alar base (continued): *A*, alae separated from lip, and base of nose freed from underlying bone. Dotted area indicates amount of undermining. Tantalum suture passed through tissues and brought out at gingivolabial sulcus. *B*, suture tied.

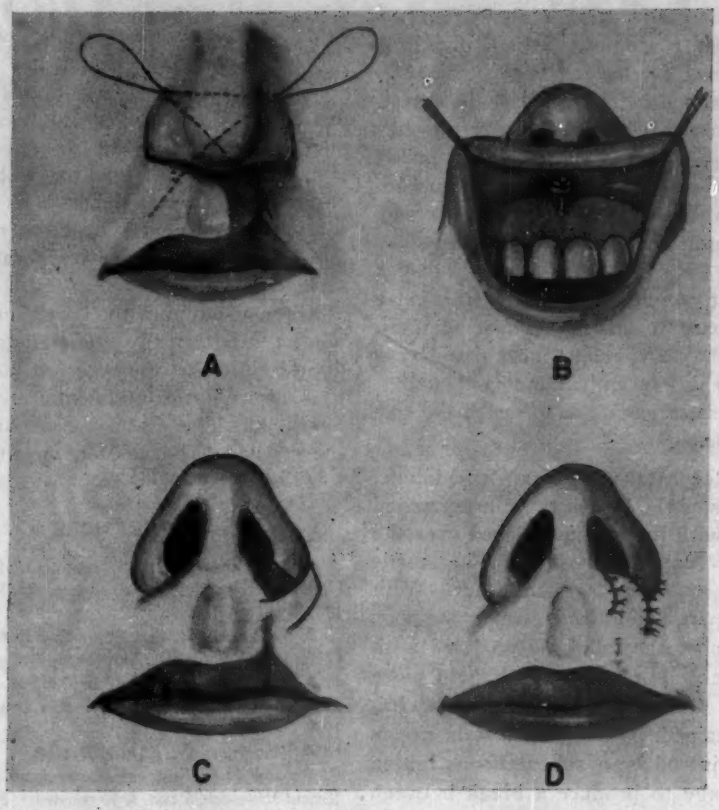

Fig. 14.—Methods of altering alar base (continued): *A*, tantalum suture passed through alarfacial groove and brought out intraorally. *B*, suture tied in gingivolabial sulcus. *C*, flap outlined, to increase alar base. *D*, flap sutured in place.

suture also serves to project the septolabial junction and elongate the columella. We have likewise employed a tantalum suture, as shown in Figure 13. We have also used a stainless-steel suture passed through the alarfacial junction and carried across the soft tissues through the opposite alarfacial junction (Fig. 14). The ends of the wire are rethreaded, made to traverse the same puncture, and brought out through the incision in the upper buckled sulcus. By traction on the suture the loops are lost beneath the skin, and the alae are brought within the intercanthal lines. The two ends are twisted over a gauze roll and left in place for 10 days to two weeks. If the affected ala falls within the inner canthal lines, it is brought out by a Z-plastic procedure (Fig. 14).

(C) Reconstruction of side walls (alae). On attempting to roll the affected ala inward, one will find that, instead of curving evenly, it will tend to crumple, with its lining bulging into the lumen. The lobule becomes flat on top, with a sharp angle at the upper outer corner. There is a twisting forward of the alar cartilage at its intercrural angle, disturbing the curve of the lobule to produce an angular droop over the nares.

To secure a more pleasing curve, it will be necessary to deliver the lateral crura. The soft tissue over the cartilage is removed. A small flap of vestibular skin is raised from the terminal end of the cartliage, its size depending on how much of the crura

will overlap. This prevents the burying of epithelium. In addition, the small flap provides a cover for the raw area at the apex of the vestibule. The cartilage is shaved and/or cross hatched, until the spring has been completely destroyed. Further modeling is done during the tip reconstruction. If the scar tissue or lack of lining prevents the rolling-in of the ala, it will be necessary to excise the cicatricial tissue and apply a skin graft. Additional cartilage grafts may be necessary to stiffen the alar margins. Finally, the ala is rotated inward and reattached to the lip with Atraumatic sutures. The normal ala is made to match the corrected one.

(D) Reconstruction of apex of lobule. The ends of the lateral crura are grasped in turn with forceps and placed over the mesial crura, the two ends being made to abut or override each other. With all the parts mobilized (cover, support, and lining), the lobule is modeled with the fingers, as one would shape a piece of clay, until the desired contour has been attained. Occasionally it is necessary to introduce a subcutaneous batten of cartilage to produce a break between lobule and dorsum.

Dressing.—The rhinoplastic dressing has been described elsewhere.[17] The outer dressing is not removed until healing has taken place—i.e., in a week or 10 days. The packing is left in place for three or four days, after which time it will come away easily. If it sticks, it is left undisturbed for a day or two longer.

Reconstruction of Lip

The lip is repaired to harmonize with the nose. Generally speaking, the correction presents no problem. The details of the technique are well described in the literature and require no elaboration here. After the utmost has been done by surgery, prosthetic appliances are usually necessary.

Summary

We are convinced that if the surgeon resists the temptation to produce a cosmetic result in the harelip infant in a one-stage operation and limits himself to laying the foundation for subsequent cosmetic surgery at puberty, he will not sacrifice an ultimate superior result in favor of an immediate temporary spectacular gain.

Reconstruction of the harelip nose cannot be satisfactorily completed without due attention to the recessed facial contour, upper lip, palate, dental arches, and lower lip. The discussion is limited to the repair of the nasal deformity.

307 Second Ave. (3).

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The Value of Suspension Laryngoscopy in Intralaryngeal Surgery

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Suspension laryngoscopy offers such an excellent approach to lesions occurring in the hypopharynx, yet is used so infrequently by the average laryngologist, that its merits warrant further discussion. As is well known, several laryngoscopes are currently employed for direct examination of the larynx. All accomplish more or less similar results by slightly different techniques. Each has its own staunch advocates, but the most widely used direct laryngoscope is the one devised by that master laryngologist, Chevalier Jackson. The Hasslinger, Bruening and Negus laryngoscopes are popular in Europe, and in this country modifications of the Jackson laryngoscope have been offered by Clerf, Tucker, Broyles, Holinger, and others. All are excellent instruments, but they all have one disadvantage, that is, the laryngoscope must be held in one hand while operative procedures within the hypopharynx or larynx must be performed with the other hand. Recently, in an effort to overcome this objection, Lewy [1] devised a laryngoscopic holder, which has proved to be a valuable addition to the instrument. However, the fact remains that the approach to the larynx offered by all these laryngoscopes is limited to the aperture of the laryngoscope, which averages slightly more than 0.5 in. in diameter, so the surgeon is compelled to perform all procedures within the larynx with one hand.

There is still another laryngoscope which offers practically all the advantages of other laryngoscopes but in addition permits performance of certain procedures within the larynx that are impossible to perform by use of other laryngoscopes. This is the suspension laryngoscope. Before its use in intralaryngeal surgery is discussed, it might be well to review its development briefly.

In 1895 Kierstein, using a tongue spatula with a hook on the end of an elongated handle, was able to visualize the larynx and vocal cords directly. Undoubtedly, this elongated tongue depressor stimulated Killian to devise his original suspension laryngoscope in 1909. Shortly thereafter Albrecht and Bruening presented their modification of Killian's instrument, and later Killian improved his model. In spite of these improvements, the laryngoscope remained rather crude with many limitations. In 1915 Lynch [2] presented his modification of the Killian laryngoscope. His changes converted a crude instrument into one of perfection and great flexibility, and, whereas to Killian must go the credit for creating suspension laryngoscopy, it is to Lynch that we are indebted for the practical instrument used today.

The suspension laryngoscope enables the examiner to see the entire oral cavity, pharynx, hypopharynx, and larynx through a wide-open mouth. The advantages offered by use of the suspension laryngoscope are twofold: it provides a wide approach, limited only by the size of the mouth, to lesions of the pharynx

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and larynx, and it leaves both hands free for performance of surgical procedures within the larynx.

Fig. 1.—The suspension laryngoscope.

The suspension laryngoscope (Fig. 1) is composed of two parts, the laryngoscope proper and the suspension crane. The laryngoscope consists of a mouth gag and tongue spatula combined and attached to a straight shaft that serves as the body of the laryngoscope and has at its upper end two hooks for attachment to the crane. The suspension crane is attached to the right-hand side of the table near its head, and its adaptability lies in the fact that by means of two small cranks it may be used as a vertical or a horizontal crane.

Whereas suspension laryngoscopy may be performed with local anesthesia, we have found that best results are obtained with general anesthesia. In recent years we have utilized thiopental sodium (Pentothal sodium) and curare with satisfactory results. Regardless of the anesthetic employed, deep narcosis is required to obtain sufficient relaxation of the throat and tongue for proper introduction of the instrument and exposure of the larynx and vocal cords to direct vision (Fig. 2). The word "suspension" laryngoscopy is actually a misnomer, as at no time is the head of the patient suspended off the table. To sit comfortably at the head of the table, direct a beam of light into the widely open mouth, and

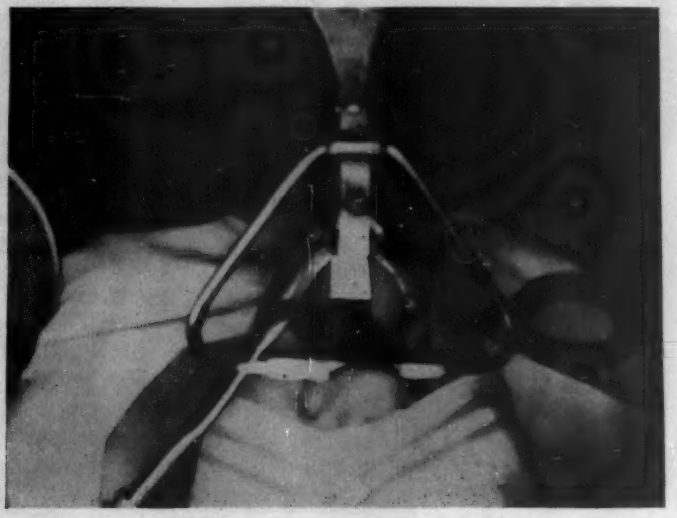

Fig. 2.—Application of suspension laryngoscopy.

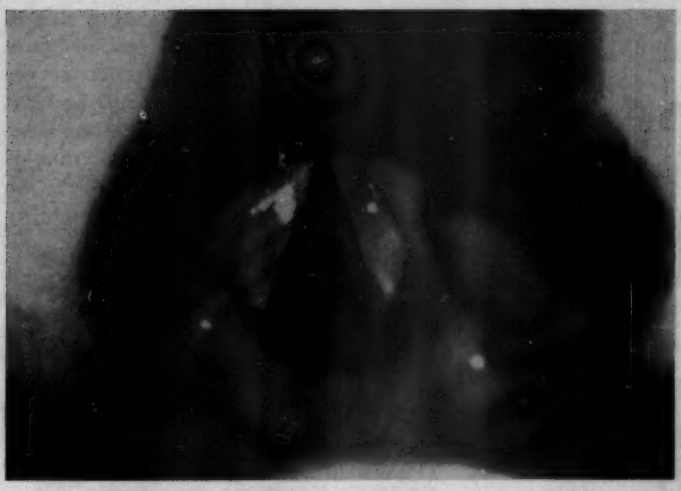

Fig. 3.—Normal vocal cords as seen with suspension laryngoscopy.

proceed leisurely to study the entire pharynx, hypopharynx and larynx (Fig. 3) is a most satisfying experience. To be able to palpate lesions, to study the depth and extent of ulcerations and other lesions, to study the gross pathology of tumors, benign and malignant, to retract the ventricular bands and vocal cords and to study the action of the cords are some of the advantages enjoyed when suspension laryngoscopy is properly used. In addition, suspension laryngoscopy permits accurate dissection of cysts and tumors, removal of foreign bodies, and repair as needed within the larynx.

Benign tumors of the larynx present the problem of accurate removal with as little trauma to the vocal cords as possible. This is best accomplished by suspension laryngoscopy because it provides excellent exposure and permits use of both hands to remove the tumor. Probably the commonest benign tumors of the vocal cords are polyps and single papillomas. We believe that such tumors are best removed, if small, by grasping with either a Yankhauer-Little forceps or an angulated cup forceps. If the tumor has a broad base, a grasping forceps is used, tension is exerted medially on the tumor, and the base is excised with a sharp laryngeal knife. With this technique there is never any necessity for pulling, tearing, or stripping of the tissues, and precise excision can be accomplished. It is always desirable to reestablish as accurately as possible the straight edge of the contact surface of the vocal cords. The vocal cords, which are delicate and sensitive, readily react to trauma. By use of the suspension laryngoscope these tumors can be excised with minimal trauma to the vocal cords; healing is hastened because the incision is sharp and clean, and consequently better postoperative results are obtained. This same technique can be used with slight changes in practically all benign tumors of the larynx. If excessive bleeding occurs, the offending vessel is caught with a laryngeal hemostat, and electrocoagulation usually suffices to control the bleeding point. Occasionally, in the removal of large tumors, sutures to control bleeding vessels and to approximate mucosa are necessary.

Small vocal nodules (Fig. 4) are best removed with a sharp angulated cup forceps or the "New" laryngeal cutting forceps. Precision is important in dealing with these nodules because they occur commonly in singers and public speakers

Fig. 4.—Vocal nodules.

in whom restoration of a normal voice is extremely important. Caution must be exercised not to remove so much tissue from the cords that a slight concavity is created. This makes accurate approximation of the cords difficult and results in a poor voice.

Chronic polyposis (Fig. 5) of the vocal cords needs particular discussion, as at times it is difficult to determine how much of this tissue should be removed. As a rule, the true edge of the cord can be faintly seen through the edematous polypoid tissue. This polypoid tissue should be sharply dissected, extreme care being taken to respect the virginity of the anterior commissure. If the commissure is violated, webbing usually occurs. If the polypoid tissue is accurately removed, excellent results can be expected.

Multiple papillomas of the larynx, occurring most frequently in underprivileged children, present a real problem to the laryngologist, particularly if they have invaded both vocal cords, the laryngeal surface of the epiglottis, and a por-

Fig. 5.—Polyposis of vocal cords.

tion of the aryepiglottic folds. Suspension laryngoscopy offers an unexcelled approach to these lesions. The laryngologist, seated comfortably at the head of the table, may, with assurance and accuracy, pinch off these multiple papillomas from the vocal cords, ventricular bands, interarytenoid space, aryepiglottic folds, and laryngeal surface of the epiglottis. These multiple papillomas have the unhappy faculty of recurring repeatedly despite all therapy. Careful pinching off of the multiple papillomas with minimum trauma to normal mucosa and creation of as little new raw surface as possible is best accomplished by means of suspension laryngoscopy.

There are many other benign tumors of the larynx that are easily managed with the aid of suspension laryngoscopy. The major problem, particularly if the tumor is located on the vocal cord, is accurate removal with as little trauma to the larynx as possible.

Lesions growing on the base of the tongue, epiglottis, or glossoepiglottic recess will require use of a short, flat tongue spatula, which will not engage the epiglottis and will permit a good view of the desired area.

Probably the greatest advantage offered the laryngologist by the use of suspension laryngoscopy is the realization that early carcinoma of the vocal cords can be successfully extirpated intralaryngeally * (Fig. 6). I know of no other laryngoscope in which this type of procedure can be carried out wtih such ease, accuracy, and success. Unfortunately, only 5% or 6% of all cordal carcinomas are seen early enough by the laryngologist to warrant such removal. The indications for intralaryngeal surgery in early intrinsic carcinoma of the vocal cords must be rigid and demanding if successful results are to be obtained. These intrinsic lesions must be seen early, when they are still small and completely surrounded on all sides by normal-appearing tissue. The lesion should be the size of a millet seed or a grain of rice and no larger than a small pea or a grain of corn, and, to repeat, it is absolutely essential that normal-appearing tissue be visualized on all sides. Complete extirpation of such lesions is possible intralaryngeally, and, following removal, the base should be thoroughly electrocoagulated. Results are excellent. We have had only three recurrences in 61 operations, with an average five-year cure rate of 95.1%. Repair of the defect created by the operation is such that in

* References 3 and 4.

Fig. 6.—Leucoplakia of left vocal cord with malignant degeneration.

many cases after a period of time it is impossible to differentiate the normal cord from the other.

Intralaryngeal arytenoidectomy, as suggested by Thornell [5] for correction of bilateral abductor paralysis of the vocal cords, is possible only by use of the suspension laryngoscope. The approach for removal of the arytenoid is facilitated because it is necessary to expose only the posterior half of the larynx. The operation requires much less time to perform than other surgical procedures proposed for correction of this type of paralysis, and the period of hospitalization is reduced. The results are comparable with those of other methods in use.

An occasional patient is encountered whose larynx cannot be exposed satisfactorily with the suspension laryngoscope. In such cases the Jackson anterior commissure laryngoscope is employed.

Summary

The advantages of suspension laryngoscopy in the performance of any type of intralaryngeal surgery cannot be too strongly emphasized. Not only does it provide an excellent approach to lesions occurring in the hypopharynx and larynx, but it leaves both hands free to perform any necessary operations within the larynx. Suspension laryngoscopy facilitates removal of benign and early malignant tumors of the larynx, and intralaryngeal arytenoidectomy is possible only by use of the suspension laryngoscope.

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Uncommon Tumors Arising from the Ethmoidal Sinus and the Nasopharynx

Report of Three Cases

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The paranasal cavity and nasopharynx are known to be loci of predilection for development of various tumors, both epithelial and nonepithelial.* The present paper presents three cases of extremely rare occurrence: a case of cancer starting from the posterior ethmoidal cavity, a case of malignant melanoma of the same locus, and, lastly, a case of ganglioneuroma arising from the nasopharynx.

Report of Cases and Comment

CASE 1.—*Anaplastic adenocarcinoma with rosette-like structure*

A 50-year-old man first noticed ptosis of the left eyelid in August, 1952, with sensation of pressure in the palpebra, accompanied by orbital pain of that side, in March, 1953, and further diplopia from May on. In October, 1953, tinnitus, unbearable frontal neuralgia, and numbness in the left half of the face were complained of. Prior to his admittance to the First Medical Clinic of the University Hospital, in November, paralysis of the oculomotor, trochlear, and second and third branches of the trigeminal nerve of the left side together with certain disturbances of the abducens and acoustic nerve were established. Diagnosis was tumor of the base of the left brain. There were few findings of note concerning sensorimotor and reflex functions, on thoracic and sella x-ray films, or on results of the laryngological examinations of the nasal cavity, nasopharynx, and oral cavity. Nor were there any palpable lymph nodes. Cerebral pressure was 100 mm. H_2O in the recumbent position.

Toward the end of November, hypesthesia in the first trigeminal branch and cephalia of the left side became much aggravated in spite of somewhat ameliorated neuralgia of the region. Polydipsia, polyuria, weak sight in the left eye, and paresis of the left abducens nerve were observed toward the year's end. About the middle of January, 1954, rigidity of the neck occurred, accompanied by aggravation of amblyopia. Cerebral pressure rose slightly, up to 110 mm. H_2O, with lymphocyte count of 22/3, while x-ray shadow revealed far-reaching destruction of the left half of the sella. Angiography, performed on Jan. 21, showed that the cerebri media was much compressed upwardly. Five hours thereafter a comatose state occurred accompanied by slack paresis of the right leg, which started to improve slowly, with moderate motor aphasia being left as a residuum of the attack. However, the status of the patient grew always graver; the symptoms of diabetes insipidus increased until the daily urine amounted to 6000 to 8000 cc., with specific gravity of 1.002 to 1.004, as a result of unquenchable thirst. Exophthalmos of the left eye became increasingly great, resulting in total loss of sight. The patient died on Feb. 16, one and one-half years after the onset of the ailment.

At autopsy the brain surface looked slightly edematous, with a rather diffuse patch of fresh subarachnoidal hemorrhage on the left side at the cerebellopontine angle and attached to the brain substance underneath; there was a tumor the size of a pigeon egg (Fig. 1, left), which held the radicles of the left trigeminal, facial, and acoustic nerves embedded within it and seemed to be a neurinoma of the last-mentioned nerve. While loosely adherent to the dura of the hind part of the middle cranial cavity, the tumor was easily separated from the underlying dura. There was another irregularly shaped tumor mass situated in the pars petrosa of the temporal bone of the size of a thumb, corresponding to the adhesion just mentioned. The anterior and posterior clinoid processes of the sella were destroyed by the tumor, which had proliferated and infiltrated over the base of the left ala magna (Fig. 1, right) and farther over the osseous hypophysial fovea beyond the sphenoidal as well as the posterior ethmoidal cavity, while the maxillary cavity remained unaffected. The tumor felt solid and compact, was reddish-gray, and contained a few well-demarcated

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* References 4, 7, 16, and 17.

Fig. 1 (Case 1).—Left: tumor the size of a pigeon egg, situated at the left cerebellar pontine angle, appearing to be a neurinoma of the eighth nerve. Right: tumor extension in the internal face of basis cranii, destroying the middle cranial fossa, sella turcica, and base of the ala magna; visible tumor mass in pars petrosa.

roundish necrotic areas here and there. On the median section of the brain, the ventricle system and the hypothalamic region appeared intact.

Microscopically, any regional diversity fails to be constated upon numerous sections from different spots. The tumor is made of a compact alveolar structure separated into sections by richly vascularized interstitium of loose connective tissue. It is similar to a type of basaloma; there is no palisade formation of spindle cells toward the periphery of the alveolar structure (Fig. 2), while in the central portion there is sometimes a figure of comedo carcinoma, as seen by areas of necrosis sharply demarcated all around (Fig. 3). By the way, one meets here within the structure now and again a fairly typical cribriform figure as well as rosette-like formation (Figs. 4 and 5).

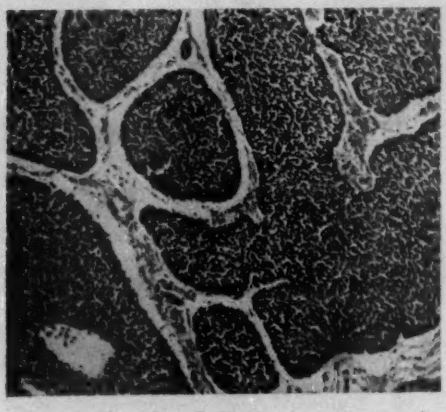

Fig. 2 (Case 1).—Solid alveolar structures demarcated by connective tissue with basilomatous appearance.

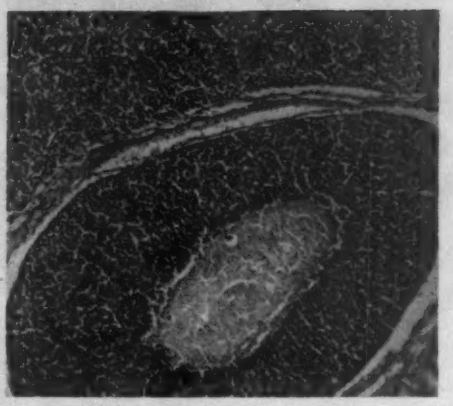

Fig. 3 (Case 1).—Demarcated necrosis in the center of the structure.

The tumor cell is equipped with a small hyperchromatic nucleus of roundish or ellipsoid or much spherically swollen shape or of short spindle shape, in each case devoid of nucleolus and meagerly provided with mitotic figures as well as with scanty cytoplasm of dim outline. The rosette-like formation mentioned above, being no true rosette but a pseudorosette representing a precursory stage to the glandular tubule, is formed by a single layer of radial arrangement of this type of cell around a small cavity. The cell nucleus is situated cen-

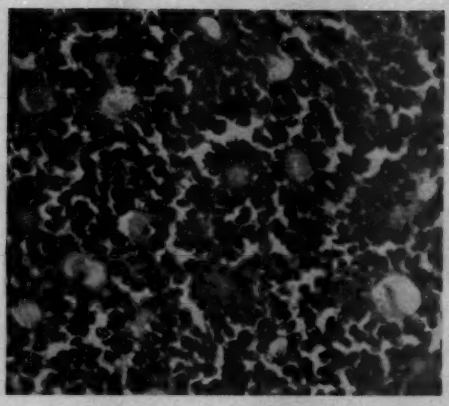

Fig. 4 (Case 1).—Rosette-like formation, non-neuroepithelial, containing mucicarmine-positive mass in the lumen.

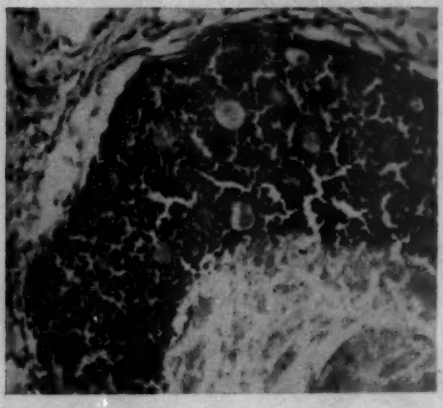

Fig. 5 (Case 1).—Same as Figure 4.

trally, and there are no cilia running out beyond the internal limiting membrane. The content of the cavity is a homogenous and acidophilic mucus specimen which reacts histochemically positively to mucicarmine and Reinhart's stain, from positive to dubious toward toluidin blue and resists hyaluronidase digestion.

A tumor with similar structure is found intruding beyond the propriomucosal layer deeply submucously into the ethmoidal cavity (Fig. 6). The major part of the posterior hypophysial lobe together with a minor portion of the anterior lobe has also fallen victim to the tumor invasion (Fig. 7). The tumor consists of areas of infiltration in lymphatic cavities and within tight connective textures of small spindle-cells which stain more deeply.

After all, there has hardly been any positive proof for the primary seat of the tumor growth being in the nasopharynx, macroscopically or microscopically. From the above, it may well be assumed that the present tumor, starting from the glandular portion or the transitional portion of the duct of the ethmoidal cellulae, possesses a potent tendency toward adenocarcinoma formation, while that tendency is expressed in pseudorosette formation, though still in a primitive stage of differentiation.

Comment.—This case deals clinically with symptoms of a basal tumor involving the left second to seventh cranial nerves and accompanied by the insipid form of diabetes. When the significance of the preponderance of rosette formations in the

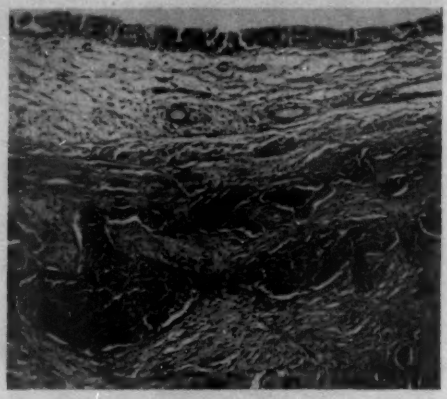

Fig. 6 (Case 1).—Tumor tissue in the sinus mucosa.

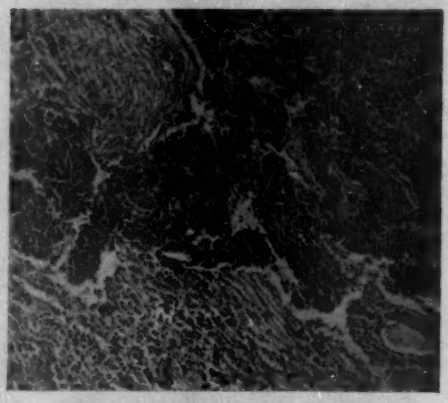

Fig. 7 (Case 1).—Tumor in the posterior hypophysial lobe just intruding into the anterior lobe.

histological sections is drawn into consideration, suspicions once of retinoblastoma, again of neuroepithelioma, and another time of medulloepithelioma may reasonably arise; in short, the existence of a tumor of neurogenic nature is considered. But, while the pseudocharacter of the rosette in question and the lack of neural elements such as neuroblasts and neuroglia safely exclude existence of an intracranial tumor, the idea of metastases from another viscus is here utterly negated also. Therefore, it follows that the primary seat shall reasonably be sought in the direct neighborhood, in the paranasal sinuses, especially in the hind part of ethmoidal cavity or nasopharyngeal mucosa, or in the tooth-germ residues or parapituitary residues. One may hereby become attentive to the section presenting histological features of basaloma and may suspect the existence of a basaloma type of adamantinoma or craniopharyngioma. Still, coexistence of other tissue types, above all the lack of well-formed stellate reticulum, will clear up such a suspicion with ease. Lastly, the nasopharynx may definitely be excluded from the question of tumor origin because there is a complete lack of cell elements originating in that region. By the way, it has been noticed that in cancer of nasopharyngeal origin there may be a lack of symptoms proper to the locus instead, cerebral symptoms due to the intracranial extension of the tumor may enter into the foreground.† For example, Simmons enumerates among 150 cases of nasopharyngeal cancer just 55 cases with disturbances of one or more cranial nerves. On the contrary, reports dealing with intracranial extension of cancer from the paranasal cavity are, so far as is known, almost nonexistent, except for one case of mucous-cell carcinoma of my own experience.

Considering the intimate anatomical relationship of the nasopharynx with the paranasal cavity, it is rather thinkable that a tumor starting from either one of them invades the other not infrequently; attention has likely been directed hitherto chiefly upon the invasion from the nasopharynx, thus relatively neglecting that from the paranasal cavity. In cancer of the posterior ethmoides, especially, nasal symptoms may be lacking and the intracranial invasion may possibly take place long before buccal swelling or metastasis into cervical lymph glands is noticed.

As to the ultimate element of the present tumor, it seems more than probable, so far as may be judged from its histological features, that it belongs to the epithelial type and, to be more exact, to "the tumor of salivary gland type" of Ringertz. Nevertheless, because I have had opportunities to witness every possible tissue pattern observable in every tumor specimen of salivary gland origin and also in those tumors sprung out of the glandular element of the paranasal mucosa as well as of the transition piece of duct repeatedly, I can hardly consent to the view that these tumors always originate in "the aberrant salivary gland tissue"; accordingly, I think it appropriate to discontinue use of the term "salivary gland tumor" so far as the paranasal tumor is concerned, in order to avoid unnecessary confusion.‡ By the way, I should like to mention that I have seen cases of parotid cancer with cribriform structure just suggestive of rosette formation, as is seen in the present instance, which fact seems to suggest something speaking for the glandular nature of the said formation. Regarding rareness of neurogenic tumors of the olfactory organ, and having the opportunity to deal with four cases of olfactory esthesioneuroepithelioma provided with true neuroepithelial rosettes, Frühling and Wild opine and assert that a certain number of these neuroepithelial cases might be erroneously taken for glandular epithelioma or sarcoma and thus be overlooked. This assertion, unthinkable as it is, appears to present a rough parallelism with what it said above by me.

† References 1, 10, 12, and 18.

‡ References 20 and 21.

CASE 2.—*Malignant melanoma*

A 65-year-old farmer had had recurrent epistaxis and obstruction of the left side of the nose since February, 1954. Excision of a polyp was rewarded by reduction of the complaints, though only temporarily, that is, until the beginning of July, when the symptoms recurred. On admission to the otolaryngological clinic of the University Hospital, persistent recidivation of a nasal polyp in the upper nasal cavity of each side was found, accompanied by a slight edematous swelling in the exterior of the radix nasi on both sides; the larynx and pharynx were intact.

X-ray revealed deep shadow in both sides, the ethmoidal cavity with cavity walls destroyed; the walls of the sphenoidal cavity appeared indistinct; the upper nasal cavity looked enlarged, with its walls, especially the left side wall, probably destroyed, while the maxillary cavity looked rather underdeveloped but unaffected. No primary field was found anywhere in the cutis or in any other part.

Because of increasing visual disturbance and sensation of heaviness in the head, resection of the maxilla was performed in August. The cellulae ethmoidales on both sides, especially the left, were occupied by a gray compact tumor mass; infiltrative proliferation of slighter degree could be pursued up to the rear half of the upper nasal cavity and sphenoidal cavity; the maxillary cavity on both sides was in a state of pyocele. Toward the end of September there appeared diplopia of the right eye with partial ophthalmoplegia, with intact fundus oculi. In the beginning of October edematous swelling of the right upper orbital region began by and by, extending upon the conjunctiva bulbi. X-ray gave dense shadow in the right ethmoidal cavity; removal of the right eyeball took place on Oct. 15. There was a dark-violet new growth with irregular outline occupying the right cavity and invading the osseous orbita, further including the obliquus superior and rectus internus. Radium treatment and serial injections of 8-azaguanine followed until dismissal, on Nov. 7. Further course remains unreported as yet.

Biopsy material of the first operation looked grayish and compact, with rather rich vascularization; that taken through amputatio bulbi looked quite different from the former, as the mass was dark violet and felt altogether soft, without any connection with the bulbus oculi and optic nerve (Fig. 8).

Histologically, the two tumors present very different and polymorphous features, in accordance with the primary and recidive case and with the locus of examination. In the primary material, the greater part shows carcinoma simplex made up of cells with medium-sized nucleus of irregular outline and of roundish to ellipsoid shape. The

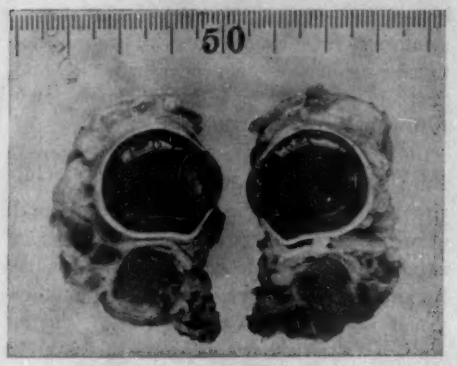

Fig. 8 (Case 2).—Tumor extension into inferior part of the right eye, starting from the right ethmoidal sinus.

chromatin is rich in amount and looks very granular, while the nucleolus always stains indistinctly; mitotic figures are met with only rarely. The cytoplasm appears rather scanty and is devoid of melanin pigment entirely. Dispersed among these, there may appear large cells with irregular outlines; again, in another place, also binuclear cells (Fig. 9). In other sections the tumor cells are

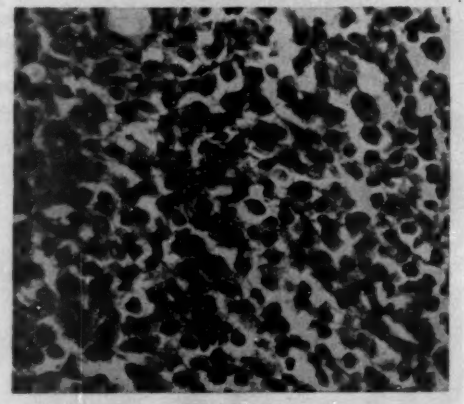

Fig. 9 (Case 2).—Malignant melanoma, showing manifoldness of histological manifestation. Tissue from the first operation.

seen forming a meshwork, by means of protoplasmic prolongations, with neighboring cells, or arranged in a sarcomatous structure are spindle-shaped dimly outlined cells which bear a small hyperchromatic nucleus of triangular, spindle, or comma shape (Figs. 10 and 11). A chain of such cells is sometimes found intruding between nerve bundles, too.

In the recidive material, the tumor consists of a conglomeration of polyhedral cells of many sizes

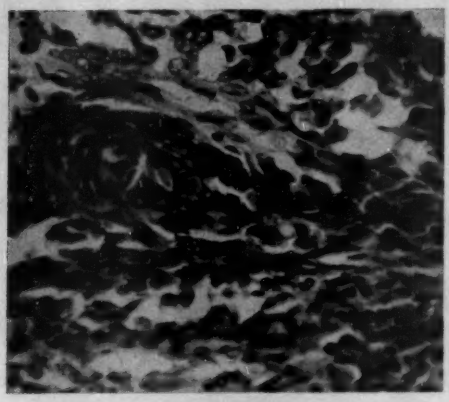

Fig. 10.—Same as Figure 9.

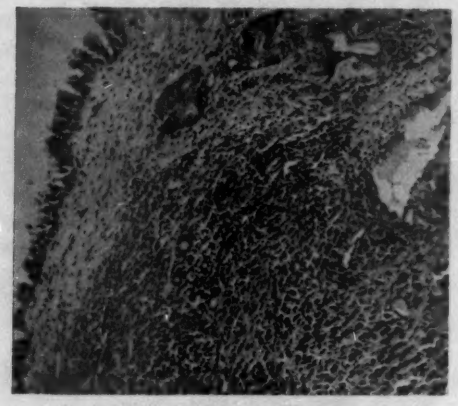

Fig. 11.—Same as Figure 9.

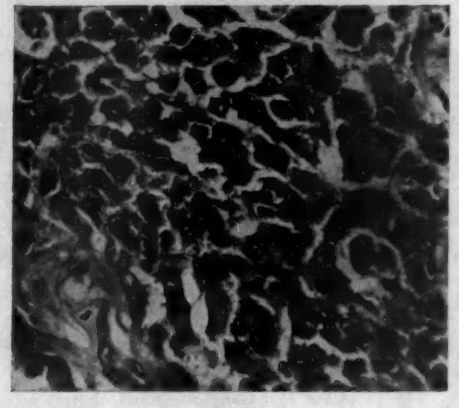

Fig. 12 (Case 2).—Tissue from the second operation.

provided with lucid nuclei of irregular outline and thick acidophilic cytoplasm. Nuclei are large and roundish, often turned to multinuclear or megalonuclear type, while mitotic figures are entirely lacking (Figs. 12 and 13). Such cell conglomerations are seen circumscribing a blood vessel which is undergoing hyalin degeneration. In sections farther from a vessel the cytoplasm is coarsely granular and the nuclei are cracked into pieces, the whole thus passing over to the necrotic portion or backwardly to the section of compactness. Especially noteworthy is the fact that here are

Fig. 13.—Same as Figure 12.

found pigment cells (Fig. 14); cells range from those containing coarse darkish-brown pigment granules to amorphous ones representing necrotic cell rests and roughly outlined by a heap of pigment granules. Diagnosis: malignant melanoma starting from the ethmoidal cavity and propagating infiltratively into the infraorbita.

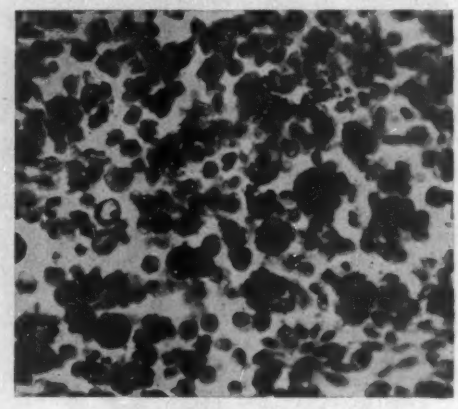

Fig. 14.—Same as Figure 12.

Comment.—Primary malignant melanoma arising from the paranasal cavity occurs extremely rarely, unlike that from the nasal cavity. Ringertz enumerated 36 cases of this tumor of both cavities reported in the literature up to 1938, adding 6 cases of his own. Of these instances, secondary proliferation or suspicion for that tumor was established in the ethmoidal bone in eight cases and in the antrum in five cases; he and Orosco each counted one certain case of primary growth from the antrum. Grace lists 66 cases up to 1947, including his own case, a Negro woman 81 years of age; however, he paid little attention to separating the paranasal instances from the others. According to Allen and Spitz's paper, dealing with 337 melanocarcinoma cases treated in the New York Memorial Hospital, there were 8 cases of nasal origin, compared with 2 of accessory sinus origin, among 51 cases of mucous membrane origin in total. In any case, the present instance seems to represent the first case of malignant melanoma of paranasal origin in Japan.

With regard to the histogenesis of melanoma, in particular that arising from the nasal as well as paranasal mucosa, which, unlike the olfactory portion, normally is free of pigment, there prevails diversitiy of opinion. For instance, a number of authors assume that it occurs in melanoblastic epithelium, a heterotopic epidermis of an early embroylogical stage § and Willis says, "but we need not always postulate a developmentai heterotopia, for epidermal structure can be aquired by metaplasia." By the way, on the one hand, Allen and Spitz think that the prelude to a mucosal melanocarcinoma should be sought, akin to that of an epidermal one, in the junctional changes of an activated nevus. On the other hand, Mayoux and Perron support Mason's theory for the explanation of the genesis of nasal melanoma, backed by experience of their own. All in all, in my opinion, one should question again and again the appropriateness of that attitude in which the genesis of the new growth in question has to be ascribed to any one origin, mesodermal, epithelial, or neuroectodermal. From this point of view the two facts that there is, firstly, so manifold a configuration of the tumor elements observed in the tumor and, secondly, the appearance of melanin pigment first in the recidival growth instead of in the primary one, must certainly be of much interest.

§ References 19 and 21; Cuzena,[8] cited by Grace.[11]

CASE 3.—*Ganglioneuroma*

In a 37-year-old male fabric worker, in May, 1954, a submucosal elongated tumor of the left side of the pharynx was found, with sensation of stoppage of the nose and of heightened pressure in the ear on both sides, but without disturbances of deglutition or of phonation. The tumor was excised on June 7 in the otolaryngological clinic of the University Hospital; since then the patient has been in sound health.

The tumor, reddish brown, 7 × 5 × 4 cm., and oval, felt uneven in solidness from spot to spot, but was elastic hard on the average, sharply demarcated by a whitish capsule. The cut surface showed side by side fibrous, solid, and cystic parts accompanied by bleeding (Figs. 15 and 16).

Fig. 15 (Case 3).—Ganglioneuroma, sharply encapsulated all around. Compact section neighboring cysts with hemorrhage.

Fig. 16.—Same as Figure 15.

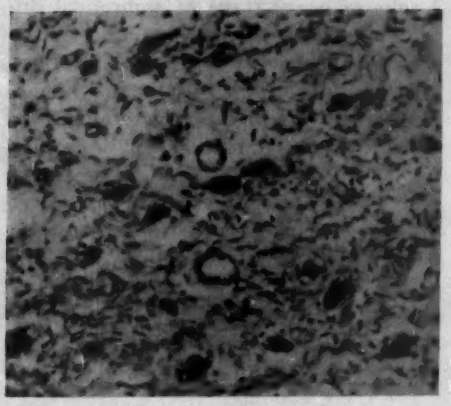

Fig. 17 (Case 3).—Well-differentiated ganglioneuroma figures.

Microscopically and in a survey section, there is a portion with well-differentiated ganglioneuromatous features neighboring a portion of predominantly fibrous texture, the former forming the superficial layers of the tumor (Fig. 17). The whole is supplied richly with thin-walled blood vessels which are ruptured here and there. Under high magnification, the nerve cells are spherical to ellipsoid, of 12μ to 30μ in diameter, and with a single hyperchromatic nucleus situated centrally or extorted; the nucleolus is sometimes distinctly stained and sometimes covered over by chromatin. The cytoplasm is very basophilic, eventually containing a mass of brown pigment granules (Fig. 18); tigrolysis prevails in the cytoplasm; in other instances, it contains well-stained Nissl granules. The nerve cells are provided with a capsule of connective tissue beside the mantle cells with small ellipsoidal nucleus, while the nerve fibers, escorted by nuclei of Schwann, are plainly of nonmyelinated character and of different thickness. From these findings there is little doubt that these belong to the sympathetic system. In a certain portion of the tumor there is seen the typical palisadal arrangement of spindle-shaped or rod-like hyperchromatic nuclei reminiscent of the construction of a neurinoma, a fibrous streak of whose cells is stained brown by the Van Gieson stain (Fig. 19). In another portion there appears a loose mesh of fiber of similar tinction equipped with ellipsoidal or rod-shaped relatively lucid nuclei, suggesting a younger type of Schwann's cell, with a series of transition forms between the neurinoma-

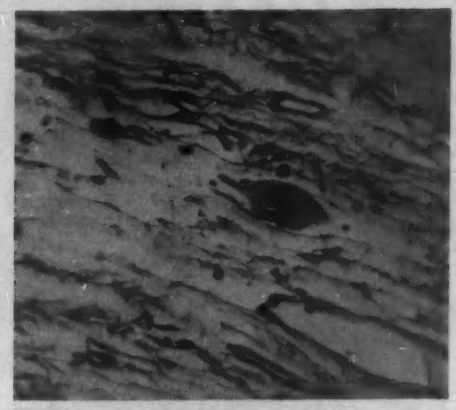

Fig. 18 (Case 3).—Nerve cell. High magnification.

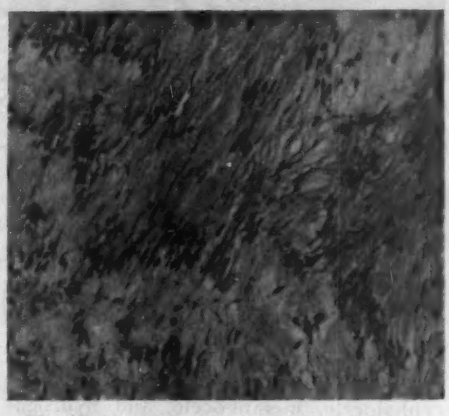

Fig. 19 (Case 3).—Neurinoma-like palisade formation.

tous structure just described. Though there are found in the cytoplasm of these formations scattered fine metachromatic granules, it remains still undecided whether they may be identified with Reich's π granula or not. Besides, scattered or in accumulation between these fibrous structures there are nerve cells, mature or immature (Fig. 20), in unipolar or bipolar forms, respectively, with all transitions toward the mature cells (Fig. 21). The latter forms must be looked upon as derived from the sympathoblast directly.

Fig. 20 (Case 3).—Less-differentiated neural elements.

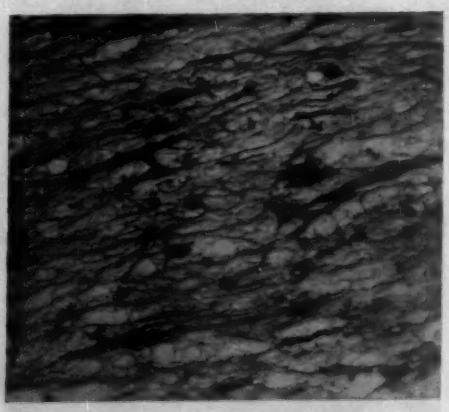

Fig. 21 (Case 3).—Bipolar element with neuroblastic make-up.

Comment.—The neurogenic tumors of the nose and throat are classified into developmental errors and neoplasms, encephalocele, meningocele, and hydroencephalocele being included in the former || and neurofibroma sive neurilemmoma, ganglioneuroma, and meningioma into the latter.[15] Of these, ganglioneuroma of the region represents one of the rarest among the neurogenic tumors, as there are hitherto only two references to it in the literature: one arising from pharynx, reported by Foster, and the other from among 33 cases of nasal and pharyngeal origin, reported by New and Devine, of Mayo Clinic. Especially fascinating as well as instructive is the fact that the process displayed here reduplicates the embryonal histogenesis of the normal peripheral nerve very faithfully. As a rule, the migrant cells from the embryonal neural crest differentiate into the sympathetic neuroblasts and sympathetic lemmoblasts, the supporting cells, i.e., capsule cells or Schwann's cells,[13] respectively. Moreover, in Case 3 cells of every stage of embryonal differentiation are represented, as well as those of transitional stages, too. Though it is questionable whether the neurinoma-like structure with palisade as described above does really possess tumor-producing ability and, therefore, whether the resultant formation may be considered as real neurinoma or not, from the appearance of the tumor it ought to be frankly acknowledged that it represents an admixture of possible combinations of tumor features made of cell types undergoing embryonal differentiation.

Summary

One case of primary carcinoma presumably arising from the ethmoidal sinus, typified with rosette-like glandular formation; one case of malignant melanoma from the same sinus, and one case of ganglioneuroma from the nasopharynx are described and commented upon. In the first case there predominated symptoms of a tumor of the base of the brain. But, upon a more minute examination of the intracranial extension in this case,

|| References 3, 5, and 15.

one necessarily becomes aware of the importance of paying as much attention, in regard to the locus of primarity of a carcinoma, to the nasopharynx and, equally, to the paranasal cavity, to the ethmoidal sinus in particular.

The second case, a case of malignant melanoma, does throw light upon the histogenesis of melanoma of mucosal origin, though the primary origin in this case remains unsettled.

The third case, a case of ganglioneuroma, was characterized by polymorphous structure, especially with a peculiar neurinoma-like formation and neuroblastic elements of early embryonal stage. The tumor presents figures of reduplication of developmental stages of normal embryonal peripheral nerve.

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Primary Skin Grafting of the Fenestra and Fenestration Cavity

Early and Late Results

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and
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Several years ago our attention was directed toward the possible advantages of primary skin grafting of the fenestra and fenestration cavity. The purpose of covering the fenestra with a split-thickness skin graft, instead of the usual Sourdille pedicle flap, was to reduce bleeding and exudation into the labyrinth with resultant serous labyrinthitis. The purpose of skin-grafting the fenestration cavity was to hasten epidermization and diminish the frequency and duration of postoperative treatments.

In 88 fenestration operations, most of them consecutive during the last three months of 1953, our usual technique was modified in this manner. Now that more than two years have elapsed, it is time to examine the results with a similar series of cases operated on immediately preceding this modification by our usual technique. Before reporting this comparative study of results we should make mention of the background which prompted use of primary skin grafting of the fenestra and fenestration cavity.

As long ago as 1943 one of us observed that the tympanomeatal pedicle flap could be detached from the tympanic membrane by accident or by deliberately cutting it off with scissors and that when placed over the fenestra it usually "took" without sloughing and with a good hearing result (Fig. 1).

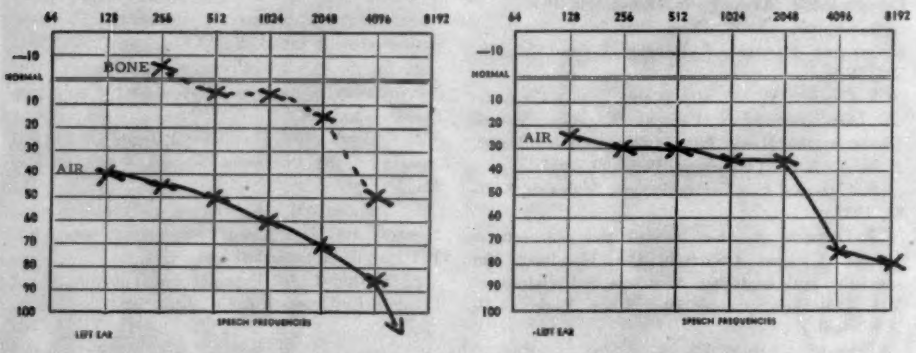

Fig. 1.—Left, preoperative. Right, 12 years after fenestra covered by detached pedicle flap.

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In 1953 one us [1] reported a study of failures in 3000 fenestration operations performed since 1938, the first 1000 of which were done from 1938 to 1946, while in the remainder of Northwestern Uni-

versity technique [2] described in 1946 was used. This method, based on animal experimentation, is designed to prevent osteogenic closure of the fenestra and utilizes continuous irrigation, the operating microscope, enchondralization, and preservation of the endosteum to the fenestral margins. Of the 2000 cases operated on by this technique, 91.9% at the last hearing test, made eight months to six years after surgery, showed a significant hearing improvement of more than 10 db. for the speech frequencies, while 8.1%, with less than a 10 db. improvement, or a loss, were classified as failures.

Individual study of the 162 failures in 2000 operations revealed 17 to be the result of closure, slightly less than 1% of operations, while 62, or 3% of operations, failed because of postoperative serous labyrinthitis, and about 4% of failures were due to incorrect selection for surgery or to subsequent cochlear

TABLE 1.—*Causes for Failure with Northwestern University Technique*

2000 Operations 1946-1952	
Improved (More than 10 db.)	1838 (91.9%)
Failed	162 (8.1%)
Closure	17 (0.85%)
Labyrinthitis	62 (3.1%)
Incorrect selection and cochlear deterioration	83 (4.15%)

nerve deterioration in the years following fenestration (Table 1). Thus, with this particular technique, serous labyrinthitis had replaced closure of the fenestra as the most frequent cause for failure, confirming the statement made in 1950 that "postoperative serous labyrinthitis has loomed ever larger as the most frequent cause for failure in the fenestration operation as the principles governing bony closure have been discovered and applied to the technique of the operation." [3]

Clinical and experimental studies of postoperative serous labyrinthitis [4] indicate that the depression of cochlear function due to the inflammatory reaction following opening of the labyrinth is greatest around one week after fenestration. It is related in some cases to excessive bleeding during surgery, but in other cases with very little bleeding permanent cochlear damage can occur. When the inflammatory reaction within the labyrinth is mild, the hearing is only slightly and briefly depressed and rapidly improves to a maximum level within a few weeks of surgery. Where the sterile labyrinthitis is severer, the hearing is depressed below the preoperative level when tested two weeks after operation, and may then improve slowly to a good result, or remain permanently depressed. Thus the two-week hearing test appears to be a useful measure of the degree of cochlear involvement by postoperative serous labyrinthitis. Suppurative labyrinthitis immediately following fenestration has not occurred in patients, in our experience, but did occur in two of the experimental animals.

Efforts to prevent postoperative serous labyrinthitis by meticulous asepsis, careful hemostasis, and elastic sponge packing against the flap reduced but did not eliminate this cause for failure. When one of our former pupils reported [5] that the postoperative labyrinthine reaction was reduced by covering the fenestra with a split-thickness skin graft instead of the usual pedicle flap, we were encouraged to use this method in a series of cases. At the same time the remainder of the cavity was lined by split-thickness skin grafts. The grafts were obtained from the thigh with an electric dermatome and kept moist with Ringer's solution until ready to use. A wedge was cut in the tympanomeatal flap over the region of the fenestra, the latter being covered by the Thiersch graft. In every case but one the graft over the fenestra survived, and in this case the fenestra eventually became covered by a thin epithelium without infection or apparent severe damage to the labyrinth (Fig. 2). It was interesting to observe that most of the patients with a skin graft covering the fenestra showed less than usual vertigo

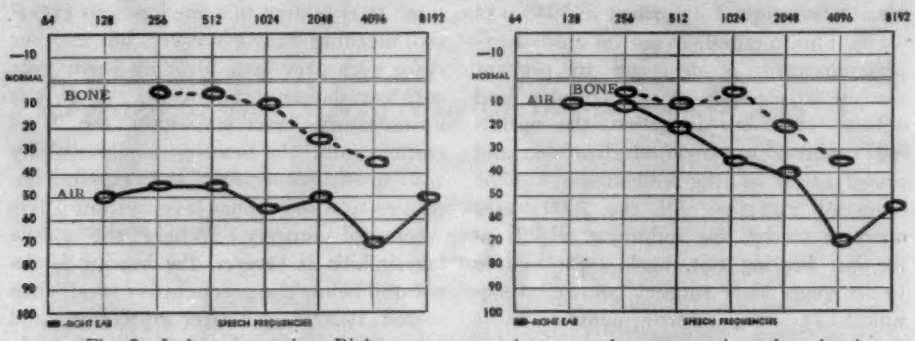

Fig. 2.—Left, preoperative. Right, two years and two months postoperative, after slough of free Thiersch graft over fenestra, with spontaneous healing by thin skin over fenestra.

and nystagmus for the first two or three postoperative days, but that many then developed moderately severe labyrinthine symptoms rather precipitously several days postoperatively, at the time when the usual fenestration patient is recovering from his vertigo.

First, comparing the healing of the cavity with use of the usual technique without a graft and with use of primary grafting of the cavity we see (Table 2)

TABLE 2.—*Time of Healing*

Months	N. U. Technique 100 Cases	Primary Graft of Cavity 88 Cases
	%	%
2	17	20
3	36	42
4	19	5
5	8	7
6	10	10
More than 6	21	26

TABLE 3.—*Frequency of Recurrence of Drainage After Healing*

Times	N. U. Technique 100 Cases	Primary Graft of Cavity 88 Cases
	%	%
None	47	50
1	24	14
2	15	8
3	7	11
4	3	8
more than 4	4	9

that there is not a great difference in the time between the two, the most significant observation being that 26% of the grafted cavities were still moist after six months compared with 21% of the nongrafted cavities. Subsequent breakdown of the epithelial lining with recurrence of discharge occurred in about half of each group, but 9% of the grafted group broke down oftener than four times, compared with 4% of the nongrafted group (Table 3).

We were particularly impressed by the excessive desquamation that occurs from the lining of the primary grafted cavities. The split-thickness skin graft adheres closely to the bone with little subcutaneous connective tissue. The surface is rough and uneven and it shows a great tendency toward excessive desquamation.

TABLE 4.—*Other Complications*

	N. U. Technique 100 Cases	Primary Graft of Cavity 88 Cases
	%	%
Attic perforations	2	11
Excessive desquamation from epithelial lining	7	34

We also observed that spontaneous perforation in Shrapnell's area was rather common in the skin-grafted cases. The comparative data of these two complications are in Table 4.

Second, we studied the degree of postoperative serous labyrinthitis as measured by the two-week postoperative hearing test (Table 5). A free graft on the fenestra appears to cause slightly more rather than less depression in cochlear

TABLE 5.—*Degree of Serous Labyrinthitis*

	Average Gain at 2-Week Test	
	N. U. Technique 100 Cases	Free Graft on Fenestra 88 Cases
A cases	+14 db.	+11 db.
B cases	+12 db.	+11 db.
C cases	+ 8 db.	+ 9 db.

TABLE 6.—*Final Result*

	Average Gain at 2-Year Test	
	N. U. Technique 100 Cases	Free Graft on Fenestra 88 Cases
A cases	+25 db. (83 % at pract. level)	+24 db. (79% at pract. level)
B cases	+23 db. (58% at pract. level)	+27 db. (60% at pract. level)
C cases	+21 db. (none at pract. level)	+11 db. (none at pract. level)

function as compared with the usual pedicle flap.

Finally, the two-year hearing results were studied (Table 6), and showed little difference in the final hearing results between the two techniques.

Conclusion

Primary skin grafting of the fenestration cavity using split-thickness Thiersch grafts in a series of cases did not, on the average, shorten the time of healing compared with a similar series of cases treated by the usual sterile technique in all postoperative dressings. Primary skin grafting does result in a rough, uneven epidermal lining without a smooth subcutaneous connective-tissue layer, and this thin epidermis desquamates excessively and breaks down frequently, with recurrence of discharge and sometimes with development of attic perforations. Therefore, we advise against primary Thiersch grafting of fenestration or radical mastoid cavities as a routine measure.

Covering the fenestra with a free Thiersch graft instead of the usual pedicle flap does not decrease the postoperative serous labyrinthitis, as judged by the two-week hearing test. This method of covering the fenestra offers no advantage over the pedicle flap and should be reserved only for cases where the pedicle flap is not suitable because of surgical trauma, abnormal thickness, or other condition.

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Coma of Multiple Origin, Including Brain Abscess

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The comatose patient presents a challenging diagnostic and therapeutic problem to the physician. An adequate history is often lacking. We must, therefore, utilize both clinical impressions and laboratory facilities. In most cases, the diagnosis is obtainable if sufficient time exists. Time is therefore our principal limiting factor. We must establish the diagnosis while the changes produced during the comatose state are still reversible. The irreversible conditions are generally those which produce discernible structural changes of the brain. Any condition may become irreversible if allowed to persist for an appreciable period of time. This period of time may be only a few minutes in some cases, whereas in others it may be a matter of many days. The key to establishing an early diagnosis lies in the awareness of the possibilities.

Inspection of the groups of conditions characterized by unconsciousness reveals a wide range of pathologic, physiologic, and psychologic processes that may be involved. I should like to present a representative, although not exhaustive, classification of the etiologic factors in coma.

The first category is that of anatomic neurological disorders. This group includes trauma, such as contusions and/or hematomas of the brain. We should also include here intracranial tumors, both benign and malignant. Also in this group are infections of the central nervous system. These infections may vary from the meningitides and encephalitides to brain abscess.

Our second group would be those conditions due to the action of drugs. Alcohol, narcotics, and various poisons are included here.

The third category is that of systemic disturbances. This would include generalized toxemias, diabetic acidosis, uremia, hepatic failure, and other severe derangements of acid-base balance.

Our fourth group can best be described as brain starvation. Examples are any of the anoxemias, whether they be due to failure of adequate cardiopulmonary function or hematologic disturbances producing severe anemias. Hypoglycemia is also a form of brain starvation.

The fifth group I should like to designate as physiologic neurological disturbances. This would cover such conditions as petit mal seizures, carotid sinus syndrome and hysteria. This group presents less of a problem than the other conditions described.

With these general thoughts in mind, I should like to review a case of coma whose care we recently shared with others.

On April 7, 1955, at 5 p.m., a 44-year-old white male recluse was admitted to the Philadelphia General Hospital. When first seen he was semicomatose. Relatives provided information that he had been a known diabetic for 14 months, and, although insulin had been prescribed, he had neglected to take it. He was also known to be a heavy user of alcohol for over 20 years. As a youngster he had supposedly been prone to convulsive seizures. He had been rejected from military service because of high blood pressure. His only recent complaint was that of earache, which had disturbed him intermittently for the past two months prior to his admission.

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The initial impression was that of alcoholic stupor combined with diabetic acidosis. This was confirmed by 4 + urine sugar, 4 + urine acetone, and 4 + serum acetone, done on the arrival in the emergency ward. Initial physical examination showed the following positive findings: temperature, 104 F per rectum; pulse, 110; respirations, 24, and blood pressure, 110/70. The left ear canal contained sanguine purulent secretions, and the right drum was injected. There was questionable rigidity of the neck; the liver was enlarged and firm; neurologic examination at this time was not remarkable beyond his semicomatose condition. Further laboratory studies showed blood sugar 389 mg. per 100 cc., with carbon dioxide 29 vol. %, indicating a moderately severe acidosis.

Five hours after admission the patient's chemistry showed marked improvement of his acidotic state. His carbon dioxide was a near normal 40 vol. % and there was no longer any acetone in his serum. But his blood pressure had risen to 200/100; his temperature rose to 106 F per rectum. He was in a deeper coma and began to have generalized convulsive seizures as well as fixed pupils. In another hour his pupils were completely unreactive. He developed complete areflexia of his lower extremities, and respirations increased to 30. His hemoglobin was 14.4 gm. per 100 cc. and, in spite of his marked febrile reaction, his total white cell count was only 6500, although there were 82% polymorphonuclears. It was now becoming more apparent that the central nervous system was involved. Accordingly a spinal tap was done. This showed grossly cloudy fluid which contained 855 white blood cells per cubic centimeter, 80% of which were polymorphonuclears. A smear of the cerebrospinal fluid showed Gram-positive cocci.

Nine hours after admission the patient fell into a very deep coma and he developed a right lateral conjugate deviation. The pulse increased to 140 and his temperature fell slightly to 104 F per rectum. All of this was in spite of the continuing metabolic improvement as the serum acetone was negative and the carbon dioxide was 42 vol. %.

Throughout the next 40 hours the patient was treated with vigorous antibiotic therapy, consisting of 1,000,000 units of aqueous penicillin every three hours, sodium sulfadiazine 1.5 gm. and oxytetracycline (Terramycin) 250 mg. every six hours. He also received 100 mg. of cortisone every eight hours. The medical men hoped thereby to aid his falling blood pressure, support his adrenals, and be otherwise fashionable. The medical men also believed that the patient was in liver failure. The patient was now well under control from a metabolic point of view but remained deeply comatose.

He was seen by the neurologists, who concurred that there was evidence of meningitis which was most likely secondary to the otitic infection. The neurologists doubted the probability of a brain abscess but conceded the possibility that there could be a posterior fossa abscess on the right side. This was the contralateral side of the draining ear. Three days had passed from the time of admission. In the interim an electrolyte system had been adequately treated, but, in spite of these corrections, coma persisted. On the third day following admission, Easter Sunday, the patient began to develop seizures on the left side early in the day and generalized seizures later. Feeling had now become stronger as to the possibility of a brain abscess of otitic origin. The neurosurgical staff and I were then consulted.

Although it would appear that we were called in late, much credit is to be given to the intern, Dr. Robert French, whose persistence was a major factor in the eventual outcome. I first saw the patient at 8:30 in the evening and felt that the picture had clearly developed into one of a brain abscess of otitic origin complicating a disrupted metabolism. The most likely location of the abscess appeared to be left cerebellum. Accordingly, the patient was scheduled for immediate surgery.

With the use of only minimal local anesthesia, which was not even necessary, a postauricular approach to the left mastoid was utilized. After removal of the cortex, the following pathology was noted: The mastoid air cells were filled with granulation tissue; the bone overlying the lateral sinus had been eroded, and the sinus wall was in view. The mastoid air cells and middle ear were completely exenterated surgically, after which I widely exposed the dura overlying the middle cranial fossa. This was incised, and only clear spinal fluid ran out. No pus was obtained. The lateral sinus was then tapped, and I found a good return of blood. More bone was then removed from the area overlying the posterior fossa. I then incised the dura overlying the posterior fossa and uncovered a small subdural cerebellar abscess. A drain was then inserted into the posterior fossa, a Panse flap laid down, and the mastoid packed with iodoform gauze. The wound was allowed to remain open.

In the next 24 hours, improvement was noted. The patient could now move all four extremities; his pupils reacted to light; his eyes could follow a little, and he responded to some stimuli. He was still not to be considered as cured. The neurosurgical staff felt that a collection might still be present, and that further exploration via burr holes was indicated. There was still some belief that a supratentorial abscess was the cause rather than one in the posterior fossa. They proceeded accordingly, and their report reads as follows: "A small occipital trephine was made and the underlying dura did not appear grossly abnormal. On opening the dura a few tiny flecks of pus were

noted. The cerebellum did not appear to be tense. There was no evidence of a mass lesion in the posterior fossa. A ventricular needle was introduced into the fourth ventricle and this structure was felt to be normal. The cerebellar hemispheres were similarly needled and no collections of pus could be found. Attention was then turned to the left temporal region. A left temporal burr hole was performed and although the underlying dura appeared slightly thickened, it was otherwise unremarkable. The underlying brain was not tense. The cerebro-spinal fluid appeared normal. A ventricular needle was introduced into the left lateral ventricle, and that structure was felt to be normal in configuration. There was no evidence of a mass lesion in the temporal lobe." In short, nothing was found, and the neurosurgeons conceded that the patient's continued state of depression was probably secondary to cerebritis.

The next few weeks were ones of steady improvement. Fever persisted, so there was a reevaluation of the antibiotic regimen. A few changes brought about a complete lysis of the febrile activity, and within three and a half weeks from the time we first saw him, he was ambulatory, afebrile, and ready for discharge. His diabetes was well controlled, and, although his ear persisted in draining, it was gradually improving with local therapy.

He was ready for discharge at this time. But now that he was out of serious difficulty, numerous other disorders became apparent. He developed gangrene of his left big toe which required amputation. He had a severe phimosis which required circumcision. He has also had a urethral stricture which required treatment. Mild liver disease still persists. But all things considered, he is in good health. His ear has stopped draining after close attention by us and our successors on the Ear, Nose and Throat Service at the Philadelphia General Hospital. A small postauricular fistula persisted. His mental state, aside from some forgetfulness, is no worse than it had been previously.

In summary, a patient is presented who was in coma on admission to the hospital. His coma, in retrospect, was attributable to four separate etiologic factors. He first was in alcoholic stupor. He then developed diabetic acidosis and moderately advanced hepatic failure. In addition he had a brain abscess of otogenic origin, which was drained via a transmastoid approach. His condition improved after surgery.

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Laryngeal Stenosis

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Laryngeal stenosis is a narrowing of the airway through the larynx. This term includes a myriad of diseases. When acute, the stenosis, if severe, is relieved by short-circuiting of the airway with a tracheotomy. A problem arises when the attending surgeon discovers the patient is unable to tolerate the withdrawal of the tracheal cannula. A chronic stenosis has resulted which may be within the larynx or the upper part of the trachea.

As attested in the literature and laryngological textbooks, the solution has many times severely taxed the ingenuity of laryngeal surgeons. Treatment is prolonged and often unsatisfactory. In order to circumvent the problem, Negus [1] once stated that wearing a permanent tracheotomy tube was no worse than wearing a denture. Agreeing, Sir St. Clair Thomson added that it was much less trouble, because a denture must be cleaned after each meal, whereas a tracheotomy tube need be cleaned but once a day.

True, a patient with a tracheotomy tube can continue to breathe and live almost indefinitely. Treatment above the tracheotomy never need be an urgent affair. Yet, the need for constant cleansing of the tube, the coughing of secretions from an artificial opening in the neck, the often noisy breathing, and the difficulty in speaking, behoove us as laryngeal surgeons to restore as soon as possible the normal functioning of the larynx.

A multiple and varied number of conditions may be responsible for laryngeal stenosis. Before the antimicrobial era and before preventive medicine reached its peak, inflammatory diseases such as diptheria, tuberculosis, syphilis, typhoid, erysipelas, and smallpox were often responsible. Today, trauma to the larynx from transportation accidents, war wounds, surgical injury, and irradiation may produce laryngeal stenosis. The larynx is protected by the resiliency of its attachment and by the jutment of the mandible and anterior chest wall. Hence, injuries to the larynx are uncommon. As so often stated by Chevalier Jackson, an important cause of laryngeal stenosis is high tracheotomy. Hypersecretion, with inability for the patient himself to remove secretions, is now a recognized indication for tracheotomy. In many diseases, such as cerebral apoplexy, chest and brain injuries, barbiturate poisoning, tetanus, and poliomyelitis, tracheotomy is done. Training the surgeon to locate the tracheal opening one to two rings below the cricoid cartilage has been advocated for years. Attention again must be focused on the proper location, since more and more surgeons are performing tracheotomies. One must especially be cautious in children and during emergencies.

Congenital causes include web formations, absence of laryngeal or tracheal cartilages, papillomata, infantile type larynx, and birth injuries to the recurrent nerves. Among miscellaneous causes of laryngeal stenosis are foreign bodies, edema, neoplasm, and external pressure of the larynx from cervical nodes, thyroid gland hypertrophy, and retropharyngeal abscess.

Any of the cartilages of the larynx may be involved by perichondral inflammation, whether by specific infectious

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disease or accidental and surgical trauma, such as high tracheotomy and laryngofissure, or irradiation. The cartilages are poorly supplied with blood vessels, and nutrition is impaired early, with resulting necrosis. The particular cartilage may be destroyed, or healing may leave remnants of cartilage. Dense fibrous tissue is formed, and, with contraction, the lumen of the larynx is narrowed. The perichondritis can cease at any stage. Since the cricoid is the only complete ring of the upper respiratory tract, involvement by perichondritis is followed by stenosis in this area more frequently than elsewhere.

Symptoms of unrelieved laryngeal stenosis are chiefly those of obstructive laryngeal dyspnea and hoarseness, with even complete loss of voice, depending upon the location and extent of the disease. Stridor, chiefly inspiratory, is often present. Acute stenosis of sudden origin, as in angioneurotic edema, may cause severe obstruction, and may be fatal if aid is not available. A gradual development of a chronic stenosis may produce a severe obstruction, yet borne by the individual without need of a tracheal cannula. Increased requirements of breathing upon exertion or speaking will accentuate symptoms suggesting the necessity for a tracheotomy. The otolaryngologist usually sees these patients with a tracheal cannula in place. The attending physician states that each attempt at removal causes such severe dyspnea that reintubation is required.

A diagnosis of the cause, extent, and type of stenosis is essential for proper evaluation. Inspection of the larynx by indirect and direct laryngoscopy will demonstrate the location of the stenosis without difficulty. Retrograde laryngoscopy through the tracheotomy wound with a nasopharyngoscope may help. Soft tissue x-rays of the neck and tomograms often demonstrate well the airway and help rule out foreign bodies. Palpating the cicatricial barrier with a filiform bougie is suggested while indirect laryngoscopy is being done.

Treatment of laryngeal stenosis cannot be undertaken in a routine manner. At first, suffocation must be prevented by a palliative tracheotomy. Later, the cause is removed by endolaryngeal procedures and, if necessary, extralaryngeal surgery may be required.

In children, the growth of the larynx with subsequent increase in the size of the laryngeal lumen allows conservatism. One must be certain that the tracheotomy is sufficiently low, that the cricoid cartilage is not near the wound. Lowering of the tracheotomy location may be all that is required. Partial corking of the cannula allows some breathing through the larynx with encouragement of its growth. Papillomata require surgical removal. Congenital web and anterior scar formation can be cured by the method suggested by McNaught.[2] He makes a midline slot in the lower two-thirds of the thyroid cartilage, followed by division of the anterior scar tissue in the midline of the larynx. He places a plate of tantalum between the cords anchored to the thyroid cartilage by tabs placed externally.

In certain cases, relief of the stenosis, if not extensive, can be obtained by repeated dilations. One must be careful not to overdilate because of the production of further inflammation. Too much success with this type of therapy cannot be expected. Bilateral abductor paralysis of the vocal cords is treated by displacing outward the position of a vocal cord with an arytenoidectomy according to the methods of Kelly,[3] King,[4] or Thornell.[5]

Laryngostomy with prolonged packing as advocated by Jackson[6] and Erich[7] is tedious, painful, and requires several operations. The aim is to reline the restored laryngeal airway with epithelium with disappearance of the cicatrix.

Schmiegelow[8] in 1929 suggested an effective method in the treatment of chronic laryngeal stenosis. First he

recommended lowering of the tracheotomy, followed by laryngofissure with complete exposure of the interior of the larynx and trachea above the tracheotomy. Scar tissue is excised, and this is followed by insertion of a rubber tube extending upward to the arytenoid level downward through the level of the stenosis. The rubber tube is anchored by silver wires to the alae of the thyroid cartilage. Skin grafting of the raw edges following the scar excision has been suggested by many authors to expedite healing. Rubber tubing is irritating to the tissues and cannot be allowed to remain longer than two or three weeks. Acrylic molds require special equipment, a nearby dental laboratory, special technique, and time. The best substitute appears to be plastic tubing, either polyvinylene or polyethylene, which comes in various sizes. Anchoring of the plastic tubing with stainless steel wire through both thyroid alae is not difficult. The wire is cut at the level of the skin. The tubing can remain in the larynx from three to six months with no evidence of irritation. Anchoring of the plastic tubing by insertion through a tracheotomy tube is another procedure. Also, as suggested by Jesberg,[9] the tube can be anchored by a tiny ring soldered to the base of the tracheotomy tube.

Report of Cases

CASE 1.—A white boy, aged 10 years, was admitted to the poliomyelitis ward at the Fresno County General Hospital on June 17, 1950. His diagnosis was bulbar-spinal poliomyelitis. His condition worsened, and the hospital resident performed a tracheotomy on June 19, 1950. Three weeks later the patient was afebrile and asymptomatic. Attempts at plugging the tracheal cannula resulted in obvious respiratory difficulty and severe apprehension. Decannulation was impossible. I first examined the boy in consulation on July 14, 1950. Indirect laryngeal examination revealed good movement of both vocal cords. Direct laryngoscopy on July 14, 1950, revealed no stenosis, but a questionable subglottic narrowing. Passage of a 4 mm. bronchoscope without difficulty allowed the patient to breathe without the cannula. As the tracheotomy was at approximately the level of the first tracheal ring, we decided to lower the opening three rings. Attempts at decannulation were unsuccessful for several weeks. On Sept. 1, 1950, we inserted a lead-filled cannula within the outer cannula. This completely blocked the passage. On Sept. 5, 1950, the patient having sustained no difficulty in breathing for the previous four days, we were able to remove the entire cannula.

Subsequently, the patient has had no respiratory difficulty. We felt that the high tracheotomy was the etiological factor, and eight weeks was required for the laryngeal tissues to adjust to the lowered location of the tracheotomy.

CASE 2.—A 31-year-old woman was involved in an automobile accident on Nov. 4, 1951. She was admitted to the hospital unconscious, and an emergency tracheotomy was done. Subsequent examinations revealed fracture of the thyroid cartilage with upward displacement of the larynx against the hyoid bone. Extensive subcutaneous emphysema involved the muscular and fascial planes of the neck. X-ray examination on Nov. 13, 1951, showed no airway through the larynx. In addition she had a fracture through the body of the mandible and compression fractures of the 9th and 10th thoracic vertebrae. She also had mediastinal emphysema with air present beneath the sternum. Dental bars were used to fix the mandible, precluding any laryngeal examination because of the inability of the patient to open her mouth. Successive attempts to decannulate her resulted in severe obstructive laryngeal dyspnea. She had no voice even when closing the opening of the tracheal cannula.

In February, 1952, the fixation wires from the mandible were removed. She was able to open her mouth a little. Gradually, however, she was able to open her mouth more and more. Indirect laryngeal examination then revealed extensive cicatrical stenosis throughout the larynx. The vocal cords were only partially visible. We attempted laryngeal dilation, but it was impossible to have the mouth open sufficiently wide to expose the larynx even when the patient was under thiopental sodium curare anesthesia. On Aug. 25, 1952, with local anesthesia, thyrotomy was performed, with the incision continuing through the cricoid cartilage to the tracheotomy opening. Wide exposure of the larynx and upper trachea was obtained. The tracheotomy opening located at the second ring was lowered three rings. Meticulous dissection submucosally of extensive scar tissue extending from the superior border of the thyroid cartilage to the cricoid was done. Irregularities of the laryngeal cartilages were also removed. Although skin grafting was considered, we decided that the procedure would be unnecessary. We next found a suitable-sized plastic tube of polyethylene which fit snugly within the larynx and upper trachea.

Anchoring with stainless steel wire to the alae of the thyroid cartilage was not difficult. The wire ends were cut close to the skin. The laryngofissure wound was closed in layers, and the tracheal tube was replaced at the lower level. The patient was allowed to go home in two days. She was comfortable during the next three months, being maintained on antibiotic therapy.

On Nov. 3, 1952, the knotted ends of the steel anchoring wire were cut. Perorally, with the laryngoscope in place, the plastic tube was easily grasped with laryngeal forceps and removed as the mouth allowed a larger opening with healing of the mandibular fracture. On the same day the tracheal cannula was removed. Her breathing, although not perfect, has been much improved over the past several months. As time passed she continued to breathe more easily, and at present does all her own housework. Her voice, although hoarse, is easily understandable. A postoperative tape recording was presented. Mirror examination of the larynx demonstrates only buds of scar tissue, and the airway appears adequate.

Summary

Laryngeal stenosis is not commonly seen. When the problem arises, treatment may be very complex and lengthy. The procedure described was employed to shorten the time necessary for treatment.

Inflammatory diseases of the larynx as causes of laryngeal stenosis are definitely on the wane, because of greater efficiency of medical preventive treatment. The increased employment of tracheotomy for many diseases today has resulted in an increase in the incidence. Trauma, due to railway, airplane, and automobile accidents, has increased the severity. Most otolaryngologists are familiar with the avoidance of high tracheotomy. Perichondritis of the cricoid cartilage from an irritating tracheal tube leads to laryngeal stenosis.

Symptoms of the disease are chiefly respiratory difficulties and hoarseness, with even complete loss of voice. Diagnosis is not difficult with indirect and direct laryngoscopy. The laryngologist usually sees these patients with the tracheal cannula in place. After the acute episode has subsided, the surgeon attempts to remove the tracheal tube. He finds that removal results in marked dyspnea. X-ray examination of the larynx may be of considerable aid to demonstrate the patency of the laryngeal lumen and any injury or disease of the laryngeal cartilages.

Treatment consists of lowering the location of the tracheotomy as soon as possible. If cicatricial stenosis is not extensive, this treatment may be all that is required. The most successful treatment has been to perform a laryngofissure with submucosal dissection of the cicatrix, followed by the insertion of plastic tubing. This procedure is done under local anesthesia. Several sizes of tubing may be tried before the correct size is found. The tubing is easily anchored within the larynx by means of stainless steel wire through the thyroid cartilage. The plastic tubing is allowed to remain at least 90 days.

Two case reports are presented. One is a 10-year-old boy who had a tracheotomy performed by the hospital resident because of secretional obstruction consequent to bulbar poliomyelitis. Attempts at decannulation resulted in severe dyspnea. Indirect laryngoscopy revealed an adequate larynx with narrowing subglottically. Lowering of the tracheotomy was all that was required.

The second case reported was a severe laceration of the larynx in a 31-year-old woman following an automobile accident. There was a fracture of the larynx with subcutaneous ephysema. In addition, fracture of the jaw complicated the problem because of her inability to open her mouth. She had aphonia. When first seen she was wearing a tracheal cannula. An attempt at dilation resulted in failure because of the inability of the patient to open her mouth. A laryngofissure was performed with submucosal dissection of the extensive scar tissue. Next, the tracheal stoma was lowered, and this was followed by insertion of plastic tubing anchored by stainless steel wire. Ninety days elapsed; the jaw now allowed

greater mobility, and the tube was removed perorally. He breathing is now adequate.

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Audiology Section

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An Audiologic and Otorhinologic Study of Cleft-Lip and Cleft-Palate Cases

I. Audiologic Evaluation

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Not least among the problems of the cleft-lip and cleft-palate person is the one of hearing loss. However, while this particular deficiency has received recognition, little is known about the nature of the hearing loss.

Previous reports in the literature have presented ideas about the problem of hearing loss in the cleft-lip and cleft-palate persons. Gaines,[1] in her study of the problem, postulated that cleft-palate children were prone to middle-ear pathologies because of the exposure of the Eustachian tube to pathological insult or because of irregularities in the tubes. She concluded that there is a greater incidence of hearing loss in cleft-palate children and that the basis for the hearing loss was dysfunction of the Eustachian tube because of anatomical deviations of the related musculature. In the study by Gannon* the relationship of several surgical variables to hearing loss in a cleft-palate population was examined. The rationale for this study was that the cleft-palate child is susceptible to middle-ear infections because of a lack of normally formed palatal structures. Gannon found that the cleft-palate group showed a greater incidence of hearing loss than did a normal population, but no correlation was found to exist between degree of hearing loss and degree of palatal cleft; age at first palatal operation, or age at final palatal operation.

Previous research and the literature have suggested generally that either tubal inadequacy or openness of the palate is the basis for a hearing loss in the cleft-palate person. Also, the high frequency of upper respiratory infections in this handicapped population has suggested the possibility that infection plus either tubal disorders or openness of the palate would precipitate middle-ear pathology and, consequently, hearing loss in many instances. Previous reports have also indicated that these losses are in the main of the conductive type with flat audiometric patterns.

It was the purpose of this research to study the hearing losses manifested in cleft-lip and cleft-palate persons in an effort to understand the nature of the hearing losses and the relationship of the losses to cleft lip and cleft palate. Review of the literature and clinical experience suggested that complete audio-

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*Gannon, J.: A Study of the Effect of Certain Surgical Variables on the Auditory Acuity of 50 Cleft Palate Children, Unpublished Master's Thesis, University of Washington, 1950.

logic and otorhinologic examinations would be necessary in this research in order to describe and evaluate factors that might be related to auditory deficiencies in cleft-lip and cleft-palate cases. The following questions were raised concerning the audiologic aspects of the hearing problems:

1. What types of hearing losses are evident in cleft-lip and cleft-palate persons?
2. How severe are the hearing losses in cleft-lip and cleft-palate persons?
3. Are there characteristic audiometric profiles for the hearing losses in cleft-lip and cleft-palate persons?
4. Are the two ears of each case similar?
5. What etiologic factors are suggested from the audiologic information?

Procedure

Sixty-nine cleft-lip and cleft-palate persons between the ages of 8 and 21 years were tested audiologically and otorhinologically. For the audiologic evaluation each patient was given a pure-tone audiometric threshold test for air and bone conduction. Calibration of the audiometer on normal ears and the artificial ear established the clinical validity and reliability of the instrument. The procedure for testing the cases was standardized in that the physical environment (a sound-treated room) and audiometric techniques were constant.

The person was classified as having a hearing loss if the thresholds at any two or more frequencies in both ears were down to 20 db.[2] The use of this definition of a hearing loss seemed justified, as it allowed for consideration of minor losses at several frequencies.

Results

According to the definition used in this study, 37 cases (54%) were placed in the hearing-loss group (Group I) and 32 cases (46%) were placed in the group without hearing losses (Group II).

Auditory Acuity in Group I

Table 1 gives the mean threshold for each frequency. The range of the air-conduction mean thresholds for the right ear was from 20.54 db. at 125 cps to 31.22 db. at 8000 cps, and it was from 17.16 db. at 125 cps to 28.24 db. at 8000 cps for the left ear. The range of bone-conduction mean thresholds was from −0.68 db. at 1000 cps to 7.43 db. at 4000 cps for the right ear and from −2.43 db. at 250 cps to 9.59 db. at 4000 cps for the left ear. The significant difference between air- and bone-conduction mean thresholds at each frequency was apparent.

In order to describe fully the level of auditory acuity of each ear the mean for each ear of each case was computed by averaging the air-conduction thresholds of all seven frequencies. The frequency distribution of the air-conduction threshold means is shown in Table 2. Twenty-three cases (62%) had mean losses of 25 db. or less in the right ear, and 32 cases (86%) had mean losses of 35 db. or less in the right ear. The distribution of mean losses in the left ear indicated that 25 cases (68%) had mean losses of 25 db. or less. Thirty-three cases (89%) had mean losses of 35 db. or less.

The handicapping nature of these losses can be better represented by the best binaural averages of 20 db. or less. The number of cases with best binaural averages of 35 db. or less was 35 (95%). Group I, when considered on the basis of its best binaural averages, consisted

TABLE 1.—*Mean Thresholds for Each Frequency for Air and Bone Conduction in Group I*

Ear	Frequency (Cps)						
	125	250	500	1000	2000	4000	8000
Right A.C.	20.54	25.41	24.32	27.57	21.62	27.84	31.22
Right B.C.	.....	−3.33	−3.51	−0.68	6.35	7.43	.....
Left A.C.	17.16	22.03	18.51	21.08	17.30	22.97	28.24
Left B.C.	.....	−2.43	−4.86	−2.36	3.08	9.59	.....

TABLE 2.—*Frequency Distribution of Air-Conduction Threshold Means in Group I*

Decibel Intervals	Right Ear	Left Ear
56–60	1	0
51–55	0	1
46–50	1	0
41–45	1	1
36–40	2	2
31–35	8	6
26–30	1	2
21–25	12	7
16–20	4	6
11–15	4	5
6–10	3	3
0– 5	0	4
Total	37	37

TABLE 3.—*Frequency Distribution of the Best Binaural Averages for Air-Conduction Thresholds in Group I*

Decibel Intervals	Frequency
41–45	1
36–40	1
31–35	3
26–30	2
21–25	2
16–20	5
11–15	6
6–10	8
1–5	7
−4–0	2
Total	37

of a group of cleft-lip and cleft-palate children in whom auditory sensitivity was not severely limited.

Auditory Acuity in Group II

Table 4 gives the mean thresholds at each frequency for Group II. The range of air-conduction means thresholds for the right ear was from −0.78 db. at 125 cps to 8.44 db. at 8000 cps. For the left-ear air-conduction mean thresholds the range was from −1.25 db. at 125 and 500 cps to 6.25 db. at 8000 cps. The range of bone-conduction mean thresholds was from −6.09 db. at 500 cps to 1.25 db. at 2000 and 4000 cps for the right ear, and from −5.47 db. at 500 cps to 2.81 db. at 4000 cps for the left ear. Significant differences were found between air- and bone-conduction mean thresholds at 250, 500, 1000, 2000, and 4000 cps for the right ear and 250, 500, and 1000 cps for the left ear.

As shown in Table 5, the mean thresholds in each ear for air conduction in Group II were computed in the same manner as in Group I. Thirty cases (94%) had mean thresholds of 10 db. or less in the right ear. All 32 cases had mean thresholds of 10 db. or less in the left ear. No case had a best binaural average greater than 10 db. (Table 6). Thirty cases (94%) had a best binaural average of 5 db. or less.

The audiometric results in Group II indicated that the cases did not have hearing losses as the term has been de-

TABLE 5.—*Frequency Distribution of Air-Conduction Threshold Means in Group II*

Decibel Intervals	Right Ear	Left Ear
16–20	1	0
11–15	1	0
6–10	8	6
1– 5	14	14
−4– 0	8	12
Total	32	32

TABLE 6.—*Frequency Distribution of Best Binaural Averages of Air-Conduction Thresholds in Group II*

Decibel Intervals	Frequency
6–10	2
1– 5	12
−4– 0	15
(−9)–(−5)	3
Total	32

TABLE 4.—*Mean Thresholds for Each Frequency for Air and Bone Conduction in Group II*

Ear	Frequency (Cps)						
	125	250	500	1000	2000	4000	8000
Right A.C.	−0.78	3.44	0.16	3.75	6.41	3.59	8.44
Right B.C.	------	−2.03	−6.09	−2.66	1.25	1.25	------
t	------	3.58*	4.92*	4.07*	3.61*	2.24†	------
Left A.C.	−1.25	3.59	−1.25	0.31	3.75	2.66	6.25
Left B.C.	------	−1.56	−5.47	−3.75	1.41	2.81	------
t	------	4.16*	3.42*	3.16*	1.84	0.10	------

* Mean difference between air- and bone-conduction mean thresholds significant at 1% level of confidence.
† Mean difference between air- and bone-conduction mean thresholds significant at 5% level of confidence.

fined. However, examination of the audiograms suggested that Group II did not represent a normal hearing group. Slight irregularities in the audiometric profiles and obvious minor losses at some frequencies indicated that the division of the 69 cases into two groups was an arbitrary delineation and that the two groups were different only in terms of degree of auditory impairment.

Types of Hearing Losses in Both Groups

Indications from inspection of the audiograms and from the differences between the air- and bone-conduction threshold means were that the hearing losses in Group I were predominantly of the conductive type, with some perceptive-type components in eight cases (22%).

Statistical analysis of the data gave the evidence that Group II had minor conductive-type deficiencies at some frequencies. Further substantiation was found in examining the audiograms for Group II, wherein 16 cases (50%) had indications of minor auditory deficiencies affecting some frequencies. On the basis of the minor losses in 16 cases, the irregular audiometric profiles in 26 cases (81%), and significant differences between air- and bone-conduction threshold means, there was good reason to believe that Group II was not a normal hearing group. Comparison between Group I and Group II could not be made on the basis that one group represented a hearing-loss population and that the other group represented a normal hearing population.

Differences Between Ears in Each Group

Comparison of mean thresholds in Group I showed no significant differences between ears except at 1000 cps. The slightly better left-ear threshold means might be explained by the fact that the left ear was the second ear tested in each case, and that this procedure reflected an adaptation process on the part of the subject. However, the right and left ears of Group I were essentially the same in level of auditory acuity.

Inspection of the mean air-conduction thresholds for Group II indicated that the left-ear air-conduction mean thresholds were slightly better than the right-ear air-conduction mean thresholds. However, the differences were not significant, and they might illustrate again the adaptation process where the left ear was the second ear tested in each case.

Differences between ears in each group were examined in terms of whether the right and left ears agreed in classification of the conductive component audiograms. Indications were that the right and left ears of the cases tended to be similar.

Both in terms of level and auditory acuity and types of audiometric patterns the right and left ears of all cases appeared to be equivalent.

Conclusions

Audiologic analysis of the 69 cleft-lip and cleft-palate cases resulted in the following conclusions for Group I:

1. Hearing losses were mild to moderate in severity.
2. The hearing losses were primarily of medical significance, although these cases might have some need for psychoeducational habilitation.
3. The hearing loss was of the conductive type, suggesting the possibility of a middle-ear pathology at one time. This was another indication for medical observation and treatment.
4. The right and left ears of Group I tended to agree in level of auditory acuity.

The conclusions for Group II were as follows:

1. While Group II appeared to have functionally adequate hearing, there were several indications of minor loss in acuity in a number of cases.
2. The conductive-type auditory deficiencies might be an indication of middle-ear pathology at one time.

3. The right and left ears tended to agree in level of auditory acuity.

Audiologic results indicated that the grouping of cases on the basis of hearing loss as defined was an arbitrary categorization. Both groups were similar in that they presented conductive-type hearing impairments that were of medical significance primarily. Further comparison of the groups could not be made on the basis that Group II represented a group of normal hearing persons.

While the design of this research did not allow for a study of incidence of hearing loss in the cleft-lip and cleft-palate population, the method of obtaining cases and the audiologic results might indicate that the incidence of hearing loss was much higher than has been previously reported. Those cleft-lip and cleft-palate persons in whom there was some hearing loss constitute over 75% of the 69 cases in the study. More than 50% of the cases had hearing losses that were significant by medical definition and would warrant special consideration because of possible communication problems.

Particular implications for the speech therapist and audiologist are evident. The mild to moderate severity of the hearing losses would indicate that over-all speech development need not be retarded but that precision in speech production might be reduced. Speech therapy techniques must be geared to the hearing loss; and visual, kinesthetic, and tactual methods must supplement the ear training methods. Also indicated by the level of severity of the hearing losses is the fact that not many cleft-lip and cleft-palate cases with hearing losses are likely to require hearing aids, auditory training, or special schools. There would probably be a need in some cases for speechreading training and special adjustments in the regular school. An outstanding requirement for cleft-lip and cleft-palate persons is the need for early and repeated audiometric evaluations.

Summary

The audiologic results of a complete audiologic and otorhinologic study of cleft-lip and cleft-palate cases are presented. It was found that this population had mild to moderate conductive-type hearing losses. The significance of the losses medically and educationally are discussed.

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Free-Field Audiometric Speech Testing in a One-Room Testing Arrangement

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The need of speech audiometry to supplement pure-tone audiometry has been firmly established. Many otolaryngologists have been discouraged from adapting their offices for this use because the number of hearing tests done would not justify the expense of a standard two-room testing arrangement. This paper is presented to illustrate that adequate testing facilities, including free-field techniques, can be installed in existing office space and still allow the room to be used for other purposes as well. In our office a recovery room was used, but a treatment room would serve just as well.

The room is approximately 7 by 9 ft. and has one door and one window (Fig. 1). The walls and ceiling are covered with acoustic tile. The floor is covered with heavy cork linoleum. The upper two-thirds of the window was closed by covering it with two pieces of plywood held apart by 1 in. spacers. The space between was filled with acoustic insulation, and the interior side was covered with acoustic tile. The lower third of the window was processed in the same way except that it was hinged in order to provide a transom for ventilation. The door was covered on each side with plywood, separated from the door itself by a ½ in. layer of sponge rubber. The interior side of the door was also covered with acoustic tile.

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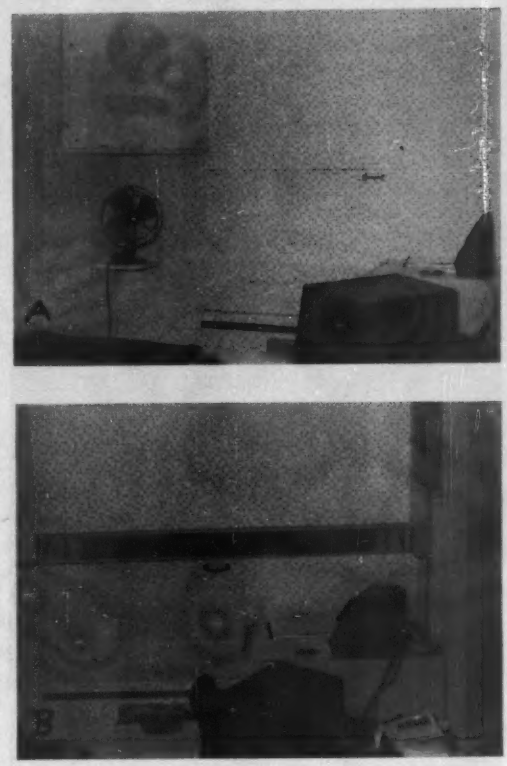

Fig. 1.—Photographs of the equipment and room showing the window transom closed for testing (*A*) and open for ventilation (*B*).

This room is by no means sound-proof, but the noise level has been reduced to the point where free-field testing is effective and accurate for patients with a hearing loss of 10 db. or more.

Description of Equipment

The basic piece of equipment is a pure-tone audiometer with a record

player, referred to as a speech audiometer. It is important that the speech audiometer be calibrated to the pure-tone audiometer. These units can be obtained as a combined two-piece unit or individually. The combination of these two units enables the audiologist to do all of the usual pure-tone tests as well as to determine speech-reception thresholds and discrimination scores.

In using recorded speech, there is sufficient sound given off by the needle on the record to allow persons with normal hearing to understand the test material with the audiometer turned to 0 db. This record noise is of no consequence in a two-room testing arrangement but prevents accurate testing at loudness levels below 20 db. in the same room as the record player. To overcome this we put the record turntable in a box lined with acoustic material, as shown in Figure 2. This inexpensive box takes the place of a second room and effectively eliminates the record noise.

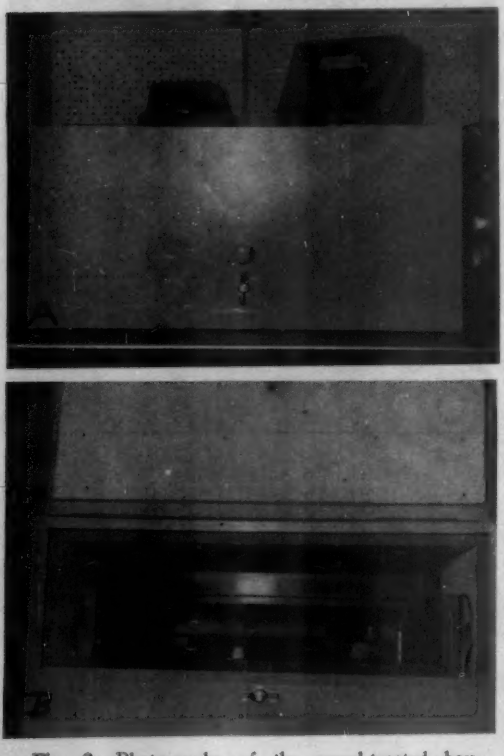

Fig. 2.—Photographs of the sound-treated box which encloses the record player with the box closed for testing (*A*) and open to change the record (*B*).

The addition of the speech audiometer is a large step forward in providing more adequate testing for the hard of hearing patients. However, this basic equipment does not allow the otologist to provide complete testing for those patients who wear hearing aids. The otologist has an obligation to these patients whom he cannot help medically. If more otologists would assume the responsibility of supervising the patient's selection and use of a hearing aid, there would be fewer dissatisfied hearing-aid users.

By the addition of a high-fidelity speaker and amplifier we completed our testing facilities. This equipment was installed by an acoustic engineer and conforms to the specifications established by the American Medical Association for audiometric equipment.

The amplifier is housed under the desk and can be turned on or off by a switch on top of the desk. The speaker is mounted in the corner opposite the patient. The circuits are arranged in such a way that they go through a central control box with a selector switch which enables the audiologist to determine what sounds go through the speaker. The recorded speech test material can be given alone or in conjunction with the masking tone of the audiometer to determine the patient's discrimination ability in the presence of noise (signal to noise ratio). Also, the pure tones of the audiometer can be used to determine the amount of amplification obtained by the hearing aid at various frequencies. We find this useful with children where speech tests are not applicable.

With an arrangement of this type it is possible to test the hearing aid with speech audiometry and compare the results with the unaided scores. If the discrimination scores with the hearing aid do not equal the unaided discrimina-

tion scores, or if the aided speech-reception threshold does not come up to the anticipated potential, the patient can be sent back to the hearing-aid dealer with specific information for adjustments.

With this equipment we feel that we can do any test ordinarily done in a two-room arrangement except those requiring live voice rather than recorded voice. It is our opinion that much more accurate testing will be done by personnel not thoroughly trained in audiology if recorded speech is used rather than live speech. We also believe that speech testing with the use of recorded material will be more accurate than pure-tone audiometric testing when done by such inexperienced personnel. When the speech tests and the pure-tone tests are incompatible, it is a warning to the otologist to determine the reason for the discrepancies, since they may be due to inaccurate testing. If the otologist finds the testing to be accurate, these discrepancies become of clinical significance.

Validity of the One-Room Testing Arrangement

After our equipment was installed it was necessary to evaluate the validity of the speech tests obtained by the free-field method. This was done by comparing the speech-reception thresholds obtained by the free-field method with the binaural speech-reception thresholds obtained with bilateral headphones. To establish the validity of our free-field testing technique, we routinely administered two speech-reception threshold tests, one using the headphones and the other using the free-field technique.

Eighty-eight consecutive patients were tested in this manner. They ranged in age from 8 to 85 years. The age distribution was good, with 35 patients in the group below 30 years, 32 in the age range 30-60, and 21 in the range 60-85.

Of the 88 cases, 31 had conductive deafness, 32 nerve deafness, 12 combined losses, and 13 normal hearing.

The speech-reception thresholds obtained by the free-field method were compared with those obtained by the use of the headphones, and correlation coefficients were computed to determine the validity of the one-room free-field method. All correlation coefficients obtained were positive and are listed in the Table.

Comparison of Bilateral Headphone Method with One-Room Free-Field Technique for Speech Testing

Category	Correlation Coefficient
All 88 cases	r=+0.95
Ages 8–30 (35 cases)	r=+0.96
Ages 30–60 (32 cases)	r=+0.99
Ages 60–85 (21 cases)	r=+0.98
Conductive loss (31 cases)	r=+0.98
Nerve loss (32 cases)	r=+0.97
Combined loss (12 cases)	r=+0.92
Normal hearing (13 cases)	r=+0.70

With the exception of the normal hearing group, all the correlation coefficients were high, indicating the validity of the one-room free-field technique.

As previously mentioned, our room is not sound-proof, but the figures support the statement that it is effective for testing patients with hearing loss. With normal hearing patients, the noise level was high enough that the speech-reception thresholds ran 5 to 10 db. higher by the free-field method than by the headphone method. This, of course, was due to the noise-dampening effect of the headphones.

Summary and Conclusions

A method of converting existing office space into a satisfactory sound-treated room for speech audiometry, including free-field testing of hearing aids, is described. An inexpensive sound-treated box to enclose the record player is used instead of a second sound-treated room. This one-room method allows the room to be used for other purposes than audiometric testing. The results obtained by free-field testing as compared with those obtained by binaural headphones are satisfactory and accurate except in normally hearing persons.

612 Republic Building (2).

Clinical Notes, New Instruments and Techniques

A HOLLOW GUIDE TO AID IN THE CHANGING OF TRACHEOTOMY TUBES

GABRIEL F. TUCKER Jr., M.D., Baltimore

The advisability of regular tube changes is well established in tracheotomy after-care. When the operation has been performed for respiratory obstruction, and the replacement tube proves difficult to reinsert, the changing of a tracheotomy tube carries with it a definite hazard. The following method is presented as an attempt to eliminate this hazard by providing not only a continuously patent airway throughout the procedure but also a guide for the insertion of the replacement tube.

Equipment

A length of tubing (the straight segment of a uretheral catheter is often quite satisfactory) of a uniform outside diameter and an inch or two longer than twice the length of the tracheotomy tube is selected. Its outer diameter is approximately the same as the outside diameter of the inner cannula for the replacement tracheotomy tube (when lubricated it should pass readily, but not loosely, through the outer cannula of the replacement). This guide is then cut with a short bevel on one end and a long bevel on the other, leaving an uncut length of tubing as long as the tracheotomy tube (Fig. 1).

Fig. 1.—Guide tube in position; tracheotomy tube in position. Also note beveled ends of guide.

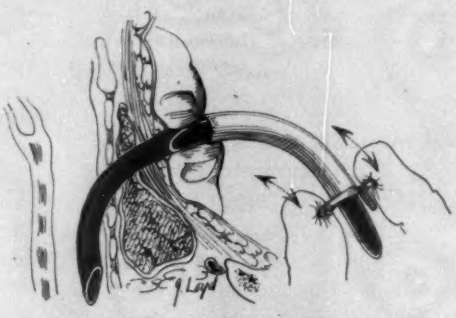

Fig. 2.—One hand keeps guide in position; other hand is used to remove tracheotomy tube and thread replacement over guide.

Procedure (Figs. 1 and 2)

1. The inner cannula of the tracheotomy tube which the patient is wearing is removed and the rubber guide introduced in its place.

2. The tracheotomy tube is then removed with one hand while the other hand keeps the guide tube in position.

3. The replacement tube, without its inner cannula, is then threaded over the long bevel of the guide tube and advanced into position.

4. The guide tube is then withdrawn and the inner cannula of the replacement tube inserted.

This procedure has been used in selected cases during the past two years; it has been found especially helpful in the following situations: (1) where the fistula is abnormally long, collapsible, or irregular, such as cases with acute irradiation reaction in the pretracheal soft tissues, thyroid neoplasm, extensive neck surgery with grafts, etc.; (2) in small children, where tracheal cartilage is often not excised and the trachea is quite compressible; (3) in the patient whose

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tracheotomy tube must be changed while the patient is in a respirator, thus limiting the space in which the replacement tube can be maneuvered.

Dr. Gabriel Tucker (Graduate Hospital, Philadelphia), Dr. Joseph Atkins (Graduate Hospital and Children's Hospital, Philadelphia), and Dr. John E. Bordley (Johns Hopkins Hospital), on whose services this technique was developed, gave their advice and cooperation. The illustrations are the work of Miss Julia Loyd, of the Department of Art as Applied to Medicine, Johns Hopkins Medical School.

The John Hopkins Hospital.

Society Transactions

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY

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CHICAGO PEDIATRIC SOCIETY

Maxwell P. Borovsky, M.D., President
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Joint Meeting, Nov. 4, 1955

The Present Status of Otitis Media. DR. PHILIP ROSENBLUM and DR. JOHN R. LINDSAY.

DR. PHILIP ROSENBLUM: Since the advent of the sulfonamides and antibiotics, complications such as meningitis, thrombosis of dural sinuses, abscess of the brain, and mastoiditis are rarely seen but not entirely eliminated. The factors involved are many, such as delayed, insufficient, and improper treatment. Myringotomy is still necessary in many cases and facilitates healing with minimum damage to the middle ear. This also permits cultures and sensitivity tests to be made.

A closer liaison between pediatrician and otologist is desirable and necessary for proper treatment and to avoid serious hearing difficulties in future life.

DR. JOHN R. LINDSAY: The types of otitis media with which the otologist has to deal in childhood years may be roughly divided into three groups: (1) acute inflammatory processes involving the tube of the middle ear in suppuration, (2) chronic inflammatory processes, and (3) chronic middle-ear suppuration. The first two groups are of equal interest to the pediatrician and the otologist. The acute inflammatory processes are oftener treated by the pediatrician, the otologist being called in only in the event of failure to cure the suppuration or a persistence of a hearing defect.

Antibiotic therapy has removed most of the element of danger to life from acute middle-ear suppuration; surgery is necessary only in rare cases. Two points in the treatment of acute middle-ear inflammation about which there has been some divergence of opinion at times have been, first, when in the course of the disease to start antibiotics and, secondly, whether or not to incise the drum. My own view is that whenever there is definite evidence of extension of the inflammatory process of the middle ear it is best to start antibiotic therapy at once without waiting for the results of a culture. In this way the extension of infection into the cell system is most easily prevented. Although many acutely inflamed ears may be due to a virus and therefore not require antibiotic therapy, it is preferable to assume at the onset in most cases that the infection is bacterial. Incision of the drum is not essential in most cases to get the infection to subside. However, the cell system, which is the seat of suppuration, can be likened to a closed abscess. In the presence of a bulging drum drainage is clearly indicated. Drainage of an abscess in such places as the brain or a thrombosed sinus, for example, is necessary to obtain a cure, even with antibiotics.

The greatest concern of the otologist at the present time is the preservation of function in the inflamed ear. There has been an increase in the incidence of retained exudate in the middle ear following acute inflammations. This occurs after both virus and bacterial infections. Otologists have been concerned that the increased incidence may have been contributed to by antibiotic therapy without drainage of the middle ear. It is not certain whether failure to incise the drum during the acute stage of suppuration contributes to the retention of exudate afterward. However, otologists are of the opinion that when there are signs of pus in the middle ear the drum should be incised.

In my experience in recent years the majority of children who seek the otologist's advice are those who do so because of impaired hearing. In most of these the loss of hearing is due to retention of either a thick exudate or a transparent serous fluid in the middle-ear space, with complete exclusion of air. This condition is commonly called secretory or serous otitis media. It may be the first evidence of advancing tubal obstruction. If it is not relieved, there is a tendency to develop middle-ear inflammatory changes with each successive infection.

Eventually the process is no longer reversible and the hearing impairment is permanent. The earlier that tubal blockage and secretory otitis media can be recognized the greater is the likelihood of preventing damage to the ear. The greatest difficulty with secretory otitis media in children is the diagnosis. The eardrum in the case which has a middle ear filled with fluid in place of air may be mistaken for normal. The contour of the drum is likely to be normal in the early case and the landmarks are present. The best clues to the middle-ear content are the increased tendency to transparency of the drum and the narrow, chalky appearance of the handle of the malleus. In children over 6 years of age a careful hearing test will detect or confirm the presence of pathology. In those under 6 years of age the diagnosis will depend upon the otoscopic examination or, if both ears are affected, the observation of the parents that the child does not hear well or pay attention. In children the great majority of cases of secretory otitis media are due to hypertrophied adenoid tissue plus infection. Hypertrophy alone does not usually cause an ear complication. It is during the acute inflammatory episode that damage occurs.

The question of treatment of tonsils and adenoids will be discussed by Dr. Galloway. In my experience the commonest indication for attention to the adenoids and tonsils in children is the presence of chronic nonsuppurative otitis media and tubal obstruction. The treatment which is usually effective in these children is a careful adenoidectomy and, if over 4 years of age, a tonsillectomy as well. Radiation is reserved for cases in which a careful adenoidectomy with the appropriate local treatment to the ears has failed to produce a good result. It is only on rare occasions that we now find a definite indication for the use of radiation.

Discussion

DR. FRANCIS LEDERER: I think my particular province here is to represent antiquity. It has been said that it is a sign of senility to reminisce. One of the earliest and most traumatic experiences I had was to appear before the Chicago Pediatric Society in the late 20's, when the late Dr. Joseph Brennemann gave a paper on otitis media in children and said that in all his experience he had never seen a case of surgical mastoiditis. In reply, I remember saying at one time that I had never had a case of lung abscess following tonsillectomy, and some internist said, "Maybe that is because you do not see your lung abscesses—we see them." Dr. Brennemann replied that when I had as many gray hairs as he had I would think differently!

At a meeting of this Society in 1931, the fathers of three of our present members, Drs. Pollock, Holinger, and Andrews, presented papers and I discussed Dr. Andrews' paper on "Acute Mastoiditis." Has the problem changed that much in these 24 years? Are we having what we anticipated in many other types of disease, a change in the bacterial flora? Did we talk about myringotomy, and are we now talking about it? Are we discussing the same problem? Were serous otitis and otitis simplex (the so-called pediatric ear) not recognized years ago? I think so. We had mastoid surgeons then who placed surgical indications when an ear was about 3 to 7 days old! There were those of us then who were more inclined to take a more conservative attitude and allow medical treatment to supercede surgical intervention.

What Dr. Rosenblum and Dr. Lindsay have said represents in no way a difference of opinion. There is no difference of opinion for anyone who knows the ear anatomically and clinically, and there should be no difference of opinion between pediatricians and otologists if they are talking the same otologic language. To give up inspection of the ear for the sake of antibiotics is no way to practice medicine. In the Chicago school survey, 69% of the parents of children were not aware that the children had problems related to the ear. Is not this a confession of failure? Many of these were ears that were given the antibiotic crutch to escape surgical indications, only to jeopardize hearing.

You heard Dr. Rosenblum allude to cholesteatoma and otogenic complications. These still exist to endanger the lives of ear patients. I would remind you of the work of Dr. Tamari and Dr. Szanto, who called attention to the fact that antibiotics brought on a new type of pathology. Just as in the lung, there are fibrotic changes in the middle ear and mastoid as well. These frequently are simmering infections. Let us understand that we must treat a focus of fluid or pus in the middle ear or in the mastoid and alleviate the immediate condition by evacuating the fluid, thereby preventing hearing loss and life-endangering complications. I should like to go along with Dr. Rosenblum: Adenoidectomy is oftener indicated than performed. The technique is admittedly poor. As one of our residents said, "Adenoidectomy and tonsillectomy is the easiest operation to perform poorly." However, when properly indicated and performed, it has a merited place in our armamentarium.

DR. PHILIP ROSENBLUM: I agree with both Dr. Lederer and Dr. Lindsay, but I do feel that early diagnosis is necessary. I think the point to stress is early diagnosis and thorough treatment. The chronic case is often the result of not carrying through properly. Otitis media, handled early and adequately, will not get to the otologist very often.

DR. JOHN R. LINDSAY: I should like to make one further comment. If we follow the principle after every case of acute otitis media of making certain that function has returned to normal, this would be a most important contribution to the welfare of the child's hearing.

Irradiation or Surgery of Tonsils? DR. THOMAS C. GALLOWAY and DR. ERICH M. UHLMANN.

DR. THOMAS C. GALLOWAY: Irradiation of diseased tonsils and adenoids, popular 30 years ago, later fell into disrepute. Results disappointed the men who followed these patients, and exploitation and poor techniques cast doubt on the method. Later reports, such as those of Uhlmann and others, indicating better control, better methods, and improved results have revived interest.

Meanwhile, indications have become stricter for surgery. In 1935 at the Evanston Hospital 1007 tonsil and adenoid operations were performed. In 1953, only 470 were done, although the hospital was 50% larger. Also, control by sulfonamides and antibiotics of acute infections and secondary effects seemed to lessen the need of removal. Greater recognition of allergy and better control of nutrition were important factors.

Apparently acute otitis media and mastoiditis have been controlled by newer agents, but otologists have noted a disturbing increase of hearing impairment, due to serous and adhesive otitis, responding poorly to treatment and probably due to uncorrected obstruction and recurring infections.

The importance of focal infection has again been emphasized by Rhoads, Coleman, and Kolmer. It does not seem possible to control foci permanently by newer agents or by irradiation.

A possible susceptibility to poliomyelitis any time after tonsillectomy is feared by a number of authors. I, after long and intensive study of the many contradictory statistics, agree that if poliomyelitis does occur within two months of tonsillectomy the dangerous bulbar form is much more likely to result. I have not been convinced that there is, later, any actual increase of susceptibility. Fallacies of poor reporting, study of hospital rather than general populations, and personal bias enter greatly into conclusions. No good explanation is offered for such action in accord with present views of the pathogenesis of poliomyelitis. An equally valid conclusion, if one grants the calculations of Anderson and others, would be that these patients were predisposed to poliomyelitis by the same susceptibility to infection that made them candidates for tonsillectomy. Seydell, in 1916, found tonsils present in 200 of 203 poliomyelitis patients and was equally justified in feeling that tonsils actually provided an atrium for the virus.

Surgery has failed at times, but in proper hands the complications are minor compared with the great benefits. For example, Works reported in 28,000 cases no deaths, only 63 postoperative hemorrhages, and 28 other mild complications. Recurrences do occur after surgery.

Reports by Clark and others raise grave doubts about the use of irradiation electively. All of Clark's 13 cases of carcinoma in children had received irradiation from 4 to 15 years earlier for disturbance of thymus, cervical glands, tonsils and adenoids, or chest. Duffy and others found a similar relationship. Since the carcinogenic action of x-ray may not be manifest for from 4 to 20 years or more, this evidence cannot be taken lightly.

Irradiation may be an ambulant treatment, is less likely to provoke acute flare-up of infection, may be used in patients with allergy or in poor general condition, and may be effective against scattered follicles.

Surgery of tonsils done under proper indications has, in my experience, given much more certain and lasting results and relief of symptoms and secondary effects. In surgery performed in the proper hands, at the right time, with the protection if necessary of sulfonamides and antibiotics, the danger is almost negligible.

DR. ERICH M. UHLMANN: I would gladly take up Dr. Galloway's challenge to discuss the biological effects of radiation, which I consider a most interesting subject. However, I prefer to limit myself to a more practical problem: the question of relating radiation therapy of tonsils to cancer of the thyroid gland. There is no proof that such a connection exists. Of the more than 2500 patients treated in my department for hypertrophic lymphoid tissue in the pharynx during the last 18 years, 1 single patient later developed carcinoma of

the thyroid. This patient was operated on by Dr. Clark. Furthermore, of 11 patients treated in my department for carcinoma of the thyroid in the age group of 4 to 12 years, not a single one had previously received radiation therapy to the neck area. Of all the patients treated in my department for carcinoma of the thyroid, the total number who had previous irradiation in one form or another is three.

I believe it would be wrong to get panicky about the observations published by Dr. Clark and to draw drastic conclusions. I am not convinced that there is any proof of a direct connection between the radiation therapy and cancer of the thyroid in the published series. There are many possible explanations, of which I shall quote only a few:

1. I consider it possible that the same factor which is responsible for the enlargement of the thymus of some of the cited patients could also be responsible for the enlargement and eventual development of malignancy of the thyroid.

2. The ratio of carcinoma of the thyroid between the two sexes is approximately 10 females to 1 male. Since radiation therapy for tonsils is, in our experience, given to both sexes in an equal proportion, this should effect the proportion of occurrence of thyroid cancer with regard to the two sexes. However, Dr. Clark's paper indicates that there were 12 girls and 1 boy in his group.

3. Cancer of the thyroid may have been present when these children were first exposed to radiation. In one instance in our own experience, a child was referred to us after having failed to respond to radiation therapy for enlarged neck lymph nodes. A biopsy was suggested and performed and revealed carcinoma in the so-called aberrant thyroid tissue. We were dealing with a metastatic carcinoma of the thyroid which, on clinical examination, had been erroneously considered to be lymphoid hyperplasia and was treated as such.

4. To my knowledge, x-rays have never produced carcinoma of the thyroid in animal experiments. The only instance of experimentally produced thyroid cancer following irradiation was found with a combination of thiouracil and radioactive iodine. It seems of interest to me that the same author who is so concerned about the effects of small amounts of x-rays to the neck area has no hesitancy in advocating the use of radioactive iodine in many hundreds of patients with thyrotoxicosis.

There are other problems which should be considered and evaluated before any definite conclusions are drawn or statements are made which might induce us to give up a form of therapy which has proved its value.

Discussion

DR. GEORGE S. LIVINGSTON: The two excellent papers we have just heard are actually not in conflict. All who have had experience with tonsillectomy and adenoidectomy know that with proper indications and technique the results are excellent. The same applies to radiotherapy. The two modes of treatment have been combined in many instances and have achieved better results that either alone.

The reports of thyroid cancer following neck and chest irradiation are very disturbing. Certainly the statistics cited do not prove an etiologic relationship, but they should alert us to a potential source of danger and warn us to proceed with great caution. The problem will probably be analogous to the alleged tonsillectomy-poliomyelitis relationship, which is still a statistical football, kicked in all directions according to the convictions of various proponents. We have seen how in this unresolved situation it has been a matter of wise public policy on the part of the medical profession to heed the warnings that have been sounded by avoiding tonsil and adenoid surgery during epidemic periods. A similar attitude probably will have to be assumed with regard to irradiation until such time as definitive knowledge may have been attained.

Since 1945 the whole world has become exceedingly radiation-conscious. Much has been learned of the benefits as well as the dangers, and much more remains to be learned. It seems to me that in the present relatively meager state of our knowledge it would be a wise precaution to at least know how much radiation every person has received. Perhaps we may be able to establish a universal system of registration, such that each person will carry an identity card bearing, with his blood type and immunization record, a listing of dates and doses of all radiation exposures.

DR. ETHEL DAVIS: It is extremely gratifying to hear Dr. Galloway say that one of the contraindications to surgical removal of tonsils and adenoids is the allergic state. Otolaryngology has really come a long way. I should like to amplify the statement that the allergic state may be a contraindication to the removal of tonsils and adenoids.

1. There is something about destructive surgery, that is, removal of tissue from the nose and throat, which may precipitate the manifestations of a major allergy in children with an allergic background who have not previously had such manifestations. 2. These allergic children are particularly subject to hypertrophy of lymphoid tissue. This hypertrophy of tonsils and adenoids produces mechanical obstruction, which may be successfully reduced by judicious irradiation. Dr. Uhlmann's experience is impressive. 3. This hypertrophy of lymphoid tissue and swelling of the nasal mucosa predisposes to frequent infections of the ears, nose, and throat. Measures directed solely against the infection usually prove ineffective unless the underlying allergic reaction is first brought under control.

DR. M. P. BOROVSKY: The indications for surgical removal of tonsils and adenoids *vs.* x-ray therapy is a controversial subject. I was pleased to hear that Dr. Galloway was in favor of x-ray therapy at times and that Dr. Uhlmann sees the need for surgical removal of tonsils and adenoids in certain cases.

The pediatrician seems to be in a better position to judge the indications in a given case for either type of therapy. He sees these children through oft-repeated nose and throat infections with varying degrees of ear, gland, and chest complications. These may recur throughout the respiratory-infection season, and this train of symptoms begins in some soon after birth. The clinical observation through these episodes is obviously of greater import than the single examination made during a quiescent period by a nose-and-throat man.

Every case is individual. I had tonsils and adenoids surgically removed from an 11-month-old boy who had had enlarged, infected tonsils and persistent posterior nasal obstruction from the age of 2 months. The improvement was remarkable, and although he comes from an allergic family, he now, at the age of 6 years, has had no major allergic manifestations. The counterpart of this case is a girl who had large bulbous tonsils in very early childhood, never had tonsillitis, and is now attending college with her tonsils in situ.

I would be more inclined to condemn x-ray treatment to the thymus gland, which was once very much in vogue, in fear of possible damage to the thyroid gland than I would condemn the exposure of the tonsils and adenoid area to these rays.

Our justifiable concern about poliomyelitis and its association with tonsillectomy may soon be greatly relieved with the advent of mass immunization with the Salk vaccine.

DR. JACK ALLAN WEISS: Considerable information has been presented by the essayists regarding the relative merits of and indications for surgical or irradiation management of the symptom-producing tonsils and adenoids. Much of this data is not wholly contradictory. In fact, it is all relevant and should be applied in order to evaluate each patient as an individual problem.

I should like to mention two points which may be considered objective criteria bearing on the choice between surgery and irradiation. First, it is generally accepted that any clinical improvement following irradiation is due to the decrease in size of the enlarged lymphoid structures, with lessening of the obstructive factor. Since irradiation does not accomplish sterilization of the bacterial flora of the tonsils, there can be little or no reduction in the infectiousness of irradiated tonsils. That size is no indication of bacterial content has been demonstrated by the work of Rhoads and Dick. Their studies showed that there was a higher bacterial count per gram of tissue in tonsil stumps than in full-sized tonsils.

Secondly, may I quote from a study of my own (to be published later) concerning histologic changes in tonsils following irradiation? This clinical investigation was done with the consent of the parents of the children, and their full knowledge of the purpose and method. In the study of several patients, one tonsil was removed. The other tonsil and the adenoids were irradiated by the standard technique and subsequently removed about one year later. Microscopic examination showed minimal differences between the irradiated and nonirradiated tonsils.

DR. THOMAS C. GALLOWAY: We seem to be in essential agreement. I think you will agree with me after hearing Dr. Uhlmann that irradiation is in excellent hands.

The question of carcinoma is important, and it will be interesting to hear from men who make further controlled studies on that. It is true that the roentgenologist can control radiation so that the thymus is not exposed, but the effect on less sensitive tissues, such as the mucosa in the nasopharynx, about which we have had some suspicion, should also be considered. I wrote one of the early papers on treatment of infection with irradiation and found this method valuable in the presulfonamide days. We are now somewhat worried about its later effect, since the latent period of carcinogenic action may be from 4 to 25 years.

We have seen many tonsils taken out and examined microscopically that showed little evidence of morphologic change. We seem to agree on allergy, and usually only after we have sent the patient to the allergist do we remove tonsils. Tonsil infection may be important in triggering allergy.

Dr. Borovsky is right in stating that the pediatrician has the final say. I have almost never taken out tonsils in children without pediatric consultation, and I am not willing to do so if overruled by the pediatrician. Occasionally he has seen repeated infections which I have not had the opportunity to see and advises operation when I have not been sure.

The Team Approach to Speech and Hearing Disorders. Dr. Robert Henner; Dr. F. J. Pollock; P. A. Campanelli, M.A.; M. W. Judiesch, M.A., and Doris P. Wheeler (a group from Michael Reese Hospital).

This presentation described work being done at Michael Reese Hospital Hearing and Speech Clinic. Various phases of the program were presented by the otologist, the clinical audiologist and speech pathologist, the clinical social worker, and the clinical psychiatrist. The Clinic was established about three years ago. It was felt that because of the special activities in the area of brain-injured children as well as emotionally disturbed children such a Clinic would be particularly useful; in addition, specialists in a general hospital could better cope with the problems of hearing and speech handicaps when welded into a group effort.

The plan of operation was outlined: (1) otologic survey; (2) audiology and speech; (3) social service; special phases of psychometrics, psychiatry, neurology, orthopedics, eye and other problems.

Discussion

Dr. Helmer Myklebust: Many aspects of this problem might be discussed, but that is not possible because of the lack of time. May I comment to the effect that the problem represented by a speech and hearing center is complex. This is because it deals with the problem of speaking, and speaking is a characteristic which is unique, basic, and fundamental to human beings. Man is the only form of life which has this capacity, and it is really strange that we do not have more fundamental knowledge with regard to the total problem of speech disorders. I use speech to include hearing, because without hearing there is no speech normally. If I could stress one thing specifically, it would be the importance of team work, because we are dealing with a complex problem from a multiphasic point of view.

When we have such a complex problem as difficulty in communicating, it does require background and knowledge of a number of different people with different backgrounds. Much has been accomplished; much remains to be accomplished. The team approach needs more development. There are many controversial issues. The people at Michael Reese Hospital are rendering a service to the community and to us in the completeness of the program they are carrying on.

Dr. Charles Lightfoot: Needless to say, I am in wholehearted agreement with the general point of view, the team approach, because that is what has been followed by the Speech and Hearing Center at the Illinois Eye and Ear Infirmary for some seven years. I should like to make an additional comment. One goal that was set forth in the paper of Dr. Pollock is an organized research program. I think it is most commendable to apply the team approach to research on speech and hearing.

Dr. Francis Lederer: We stated some years ago, from our experience in Military Service, that Chicago and its environs could stand for eight of these audiological centers. I think it is commendable that in each one, in each hospital facility available to this area, progress is being made. No one person can go it alone in the solution of this problem. The time did not permit the group to tell you the details of the service to be rendered under this program. It seems to me that at this time the teams of medical and perimedical workers have joined forces. Their combined efforts will result in a victorious solution to the problem of communicative disorders. All who are engaged in such work, under the stimulus of otologists, are to be commended for the splendid work that is being carried out.

Dr. Robert Henner: With regard to research, the work in progress is on premature children, and we are surveying for hearing handicaps. Briefly, as an otologist with little background in this field, I want to say that it has been a rich experience for me. The difficulty of diagnosis and the special education required by these children takes real saints to achieve a maximum result.

Abstracts from Current Literature

Ear

VESTIBULAR FUNCTION IN DEAFNESS AND SEVERE HARDNESS OF HEARING. JORGEN ARNVIG, Acta oto-laryng. 45:283 (July-Aug.) 1955.

Four hundred eighty-six children were examined with rotational and caloric testing in schools for the deaf in Copenhagen and two other Danish cities. The results were as follows. There was normal vestibular function in the large majority of cases with severe inherited hearing loss. Only in cases with hearing loss acquired after birth was the vestibular function abolished in the severe acquired varieties. The reverse was true in cases in which the hearing loss was acquired in fetal life or during birth. The results gave a surprising conformity in the group with inherited hearing loss and that of unknown etiology. It is believed that the most reasonable cause here is genetic factors. In 8% of cases there was a difference between the result of the caloric test and that of the rotary test. As syphilis had been ruled out as a factor, such discordance should no longer be regarded as a definite sign of syphilitic neurolabyrinthitis.

ROBERT LEWY, Chicago.

CLINICAL CONSIDERATIONS ON THE AURAL REFLEXES OF BECHTEREW AND KISCH. A. LASKIEWICZ, Acta oto-laryng. 45:355 (July-Aug.) 1955.

This paper discusses the innervation of the external auditory meatus and the tympanic membrane. It covers as well the physiology of the cochlear-facial reflex of Bechterew and the auropalpebral reflex of Kisch. The author believes these are separate reflexes. In a series of 86 cases including middle-ear, inner-ear, and eighth-nerve lesions, the relationship between the sensitivity of the meatal wall and the tympanic membrane and the reactivity of the vestibular apparatus could be noted. In instances of chronic catarrhal otitis media and Eustachian salpingitis wherein there was some ossicular stiffening, the auropalpebral reflex became evident after catheterization or bouginage of the Eustachian tube. Bilateral blepharospasm and lachrimation and head tilting also occur.

In post-traumatic, occupational, and detonation deafness this was feeble, but by stimulation with the Galton whistle, Brany noise box, or the monochord the cochleofacial reflex appeared as the clearer response. There was evident parallelism between the facility of elicitation of both reflexes and the recruitment phenomenon in Ménière's disease.

ROBERT LEWY, Chicago.

AUDITORY FUNCTION AS RELATED TO THE COMPLAINT OF DIZZINESS. C. M. KOS, Laryngoscope 65:711 (Aug.) 1955.

In the diagnosis of vertigo, an auditory survey is most important. In addition, there should be an otoscopic and ophthalmic examination, x-rays of the internal auditory meatus, and caloric and neurologic examinations. It is important to differentiate between peripheral and central types of dizziness.

Nearly all peripheral vestibular disturbances are accompanied by hearing loss; less frequently are the central ones.

Recruitment, the Békésy-type audiogram, and auditory threshold fatigue are all helpful in differentiating between cochlear and neural lesions. In cochlear lesions there is recruitment, a short Békésy excursion, and absence of threshold fatigue.

In Ménière's disease, the hearing loss is usually unilateral. Early the low tones and later all the frequencies are involved. There is also recruitment, although it may disappear late when the hearing nerve becomes affected. Threshold fatigue is not present.

Labyrinthian ischemia gives a high-frequency inner-ear type of hearing loss which does not fluctuate and may or may not show recruitment. It is usually bilateral. Hearing loss is of high frequency and never fluctuates but progressively deteriorates. It is commonly associated with arteriosclerosis.

In labyrinthian apoplexy the vertigo is severe, constant, and gradually decreases over a period of months as the other labyrinth takes over. There is severe unilateral hearing loss.

Hearing loss is the most frequent initial symptom of acoustic neuroma. There may be dizziness but no recruitment, and the threshold fatigue is notably present.

Multiple sclerosis shows slight hearing loss, though vertigo may be severe. There is no recruitment but excessive threshold fatigue.

These examples illustrate the importance of hearing-loss evaluation in the determination of the cause of vertigo.

HITSCHLER, Philadelphia.

SECRETORY OTITIS MEDIA REQUIRING MASTOIDECTOMY. WILLIAM J. HITSCHLER, Laryngoscope 65:722 (Aug.) 1955.

A case of secretory otitis media did not respond to any of the usual means of treatment. These included repeated inflations, myringotomies, and antibiotic and antiallergic treatment. Because of distressing tinnitus and discomfort, a mastoidectomy was performed. There was much fluid, fibrosis infiltration, and some bone destruction present. The operation relieved the patient's distressing symptoms, tinnitus, and full feeling but did not improve her hearing loss.

AUTHOR'S SUMMARY.

EXTERNAL UMBO BLEBS: NON-INFLAMMATORY LIPOID VESICLES OF THE TYMPANIC MEMBRANE. B. W. ARMSTRONG, Laryngoscope 65:817 (Sept.) 1955.

Noninflammatory blebs at the umbo of the eardrum have rarely been mentioned in the literature. In 24,000 consecutive ears, 66 blebs were found. They are small (1.5-4 mm. in diameter), smooth, and glistening. They contain a clear, usually colorless, oily fluid. There are no cells or organisms present. These blebs may be eliminated by simple incision, but it is doubtful whether or not any treatment is necessary. Their etiology is unknown, and they are entirely asymptomatic.

HITSCHLER, Philadelphia.

EVALUATION OF TRANSTYMPANIC MOBILIZATION OF STAPES AS A TREATMENT FOR OTOSCLEROSIS. ALAN AUSTIN SCHEER, Eye, Ear, Nose & Throat Month. 34:569 (Sept.) 1955.

The technique of stapes mobilization is described in detail, with special emphasis on certain safety measures which may be taken to prevent mishaps. This technique can restore hearing in some patients with stapes fixation, but all stapes which are fixed cannot be mobilized. It is difficult to ascertain the degree of stapes fixation prior to surgical intervention, as often there is no correlation between the amount of deafness and the degree of stapes fixation. A successful fenestration operation can be performed after an unsuccessful mobilization procedure. In a series of 100 cases which have been followed 10-18 months, 33 patients, or 33%, had a hearing improvement up to or above the practical 30 db. level in the speech frequencies. Of these 33 patients, 28 have maintained their original hearing improvement for a period of time varying between 14 and 18 months.

In the four patients in whom the hearing returned to the preoperative level, this occurred within one month. When revisions were preformed in these four patients, it was found that stapes fixation had recurred. Following remobilization, the hearing returned to approximately the same level that had been attained with the first mobilization, but improvement was not retained. Of the 67 patients who were not improved after operation, 37 had successful mobilization of the stapes and in 30 patients the crura were fractured. When clinical improvement and hearing was obtained it was always experienced at the time of the operation, and the maximum improvement was obtained within five days.

JENNES, Waterbury, Conn.

THE MANAGEMENT OF SOFT TISSUES IN TEMPORAL BONE SURGERY. KENNETH MCASKILE, Laryngoscope 65:935 (Oct.) 1955.

The postauricular incision is preferred for simple mastoidectomy. There is better accessibility and less chance of perichondritis. Complete closure of the wound has been used successfully in several cases.

The value of conservative handling of the chronic ear, especially that of the soft tissue, is being more and more recognized.

Postoperative care of these tissues is equally important, as are the operative procedures. The endaural incision is preferred in most surgery of the chronic ear, as it gives better accessibility to the middle-ear structures.

Detailed technique is described. A thinned graft from the meatal flap is planted in the middle ear. Sometimes it is desirable to use a second graft 10 days postoperatively. At that time, because of an underlying layer of granulation tissue, the chances of its survival are greater. Absorbable gelatin sponge (Gelfoam), placed over the graft, protects it. The management of the meatal openings, a common cause of postoperative complications, is discussed. It is important that this area be completely covered with skin. A careful selection of the line of the initial incision is important. It should be 6 mm. deep to the conchal margin. Any injury to the facial nerve should be taken care of at once. Relieving the pressure of the packing is often all that is necessary.

Perichondritis is to be avoided by care in not damaging the cartilages. When it does occur, it is usually caused by B. pyocyaneus. Hot compresses, the application of neomycin ointment, and drainage, when necessary, all aid in its management.

HITSCHLER, Philadelphia.

NEW ORIENTATION OF SURGERY OF DEAFNESS. MICHEL PORTMANN and GILBERT CLAVERIE, Rev. laryng. (Bordeaux) 76:817 (Nov.-Dec.) 1955.

In reevaluating the present-day surgical procedures for deafness, the authors first discuss the role of the tympanic membrane, ossicular chain, ossicular muscles, round and oval windows, and the Eustachian tube. They illustrate the various alterations and the pathways of transmission of sound when there is pathology involving each of these areas.

They then discuss the various operations. These operations should vary depending upon the underlying pathology. Actually three specific surgical procedures are discussed. The first procedure discussed is stapes mobilization. This should be reserved exclusively for an ankylosis of the footplate of the stapes in the oval window to the complete exclusion of any other lesion.

The second surgical procedure is fenestration. This should be a palliative procedure for an immobilization of the ossicular chain of whatever cause, either inflammatory or otosclerotic, with either a fibrous or bony ankylosis but with good function of the round window. The interruption of the ossicular chain is not important, since the creation of a new opening will permit the transmission of the sound waves through the new membrane or flap. However, it is extremely important that the round window should be normal and fully protected.

Tympanoplasty is also discussed. Its purpose is to restore the tympanic cavity to more or less normal anatomic condition so that the proper transmission of sound can be effected. The authors discuss the indications for tympanoplasty and set up a classification which should determine the extent of their surgery. They quote Wullstein and Pietrantoni, whose technique has been followed throughout.

Group I includes those cases where there is a lesion of tympanic membrane but the ossicular chain is intact. Here, after an exenteration of the pathologic condition and the diseased epithelium in the tympanic cavity, a thin skin graft is put in place covering the tympanic cavity and also the perforation of the tympanic membrane.

Group II consists of those cases wherein the pathology involves not only the tympanic cavity but also the ossicular chain but does not involve the stapes. Here the authors resect the superior wall of the bony tympanum and remove the malleus and the incus and exterpate the mucosa of the promontory and tympanic cavity. Then a very thin skin graft or a piece of amniotic membrane is inserted. This should cover the entire area and also cover the head of the stapes.

In the third group of cases, the entire ossicular chain has been completely destroyed, including the stapes. Here the stapes is removed, if present, and the flap is directly applied to the oval window, or sometimes a small cylinder of acrylium is inserted between the flap and the open oval window.

They then present a series of audiograms representing the results of both the tympanoplasty and the fenestration operations.

Finally, the authors discuss the technique for a mobilization of the stapes. In evaluating

this last procedure they have tabulated its statistics as compared with those of fenestration. The advantages of stapes mobilization are that it is a physiologic principle, the maximum results are perfect, the indication is a negative Rinne test but the cochlear reserve is of variable importance, the surgical risk is essentially insignificant, and the ultimate failure is that there would be no improvement. The actual surgical procedure is of short duration: from one-half to one hour. The postoperative convalescent period is very short. The patient may, at times, go home the same night. The ultimate results show 50% success. If there are recurrences, repetition of the operation frequently yields success. Finally, the fenestration is always possible after mobilization. On the other hand, with fenestration there is a partial destruction of the ossicular chain. In the indications one must have a negative Rinne but the cochlear reserve must always be good. In a certain percentage of cases, there is not only an increase in the deafness but also a total loss of hearing. The surgical procedure is much longer and more complex. The hospitalization is also longer. In a one-stage fenestration the hospitalization period is a minimum of 10 days; in a two-stage, the minimum is 7 days for the first stage and 2 or 3 days for the second stage. However, their final results are better; there is 70%-90% of success, depending upon the various statistics. On the other hand, if it is necessary to reoperate due to the closure of the fenestra, the success of this reoperation is very uncertain. In closing, the authors state that any decision of surgery should depend upon the pathologic conditions and should have as its aim an anatomic reconstruction of function of the sound apparatus. Techniques will change from time to time, but each case must be evaluated on its own pathology. Other techniques may be developed, and what is probably a rational technique today may be completely changed in a few years.

PERSKY, Philadelphia.

STRICTURE OF THE EXTERNAL AUDITORY CANAL. G. O. PROUD, Laryngoscope 66:72 (Jan.) 1956.

Stricture of the external auditory canal is defined as an acquired closure rather than a congenital absence. The cause may be a burn, wound, or surgical procedure.

Mastoid disease is usually present and can be demonstrated by x-ray; although pain and postauricular fistulae are apt to be the chief complaints, there is always some hearing loss.

Infection of the middle ear and usually of the mastoid, with or without cholesteatoma, is present.

Treatment consists in making anteauricular incisions, thus creating two triangular flaps. These are thinned and held by postauricular sutures. The diseased middle-ear and mastoid tissue is removed and a skin graft applied. Permanent patency of the canal is obtained by this procedure.

HITSCHLER, Philadelphia.

Larynx

THE TREATMENT OF TRACHEAL STENOSIS IN TRACHEOTOMIZED POLIOMYELITIS PATIENTS. J. FALBE-HANSEN, Acta oto-laryng. 45:498 (Nov.-Dec.) 1955.

It is generally accepted that the best way to avoid complications following tracheotomy is early decannulation. There is a risk, most particularly in children, that the convex portion of the tube will cause a stenosis by its pressure against the upper anterior tracheal wall. In simple cases this may be corrected by stitching the depressed tracheal wall to the skin in the upper part of the tracheotomy wound or by inserting a T-tube. In others, as in the instances reported here, there is too much scar tissue for this to be accomplished. In these instances the scar tissue is removed and a polyethylene tube of suitable width and length is inserted. The tube is fixed with silver wire through the skin. After three to five months the tube is removed by direct laryngoscopy. In one case a specially devised silver chimney tube was used.

ROBERT LEWY, Chicago.

LARYNGOCELE: LARYNGEAL AIR SAC OF LOWER ANIMALS APPEARING IN MAN. WILLIAM J. KUCERA JR. and ROBERT E. PRIEST, Minnesota Med. 39:137 (March) 1956.

This paper reports three instances of laryngocele and reviews the literature on the subject. Earliest reports go back as far as Larrey, a French army surgeon in Cairo. He found the condition in Korean chanters, who strained their voices from the tops of minarets while calling the faithful Mohammedans to prayer. Virchow introduced the term laryngocele in 1867.

Three cases are presented: one of the internal type, one of the external type, and one of the

combined type. Diagnosis is usually established by indirect laryngoscopy, which reveals the laryngocele. Symptoms include hoarseness and on occasion some difficulty in swallowing. The correction of the condition is by surgery. This has to be planned to meet the special circumstances of each individual case. In some instances external incision alone will do the job; in some cases this may have to be combined with a thyrotomy and, on occasion, tracheotomy.

ROBERT LEWY, Chicago.

Nose

BACTERIOLOGY, SINUS SURGERY AND EYE DISEASES. M. GOODMAN, D. G. VOORHEES, and W. REINER-DEUTSCH, Eye, Ear, Nose & Throat Month. 34:447 (July) 1955.

The study which is the basis of this article was initiated by the Chronic Infection Research Group of the New York Eye and Ear Infirmary with the aim of exploring thoroughly the bacteriologic aspect of ocular inflammations and correlating the bacteriologic findings with the standard clinical criteria for suspected sinus involvement. Sinus tissues suspected of containing pathogenic bacteria were removed surgically. Pathogenic bacteria were recovered consistently despite negative bacteriologic studies obtained preoperatively. The data obtained in the study of 13 cases are presented in detail. The authors conclude that the poor correlation existing between preoperative and postoperative bacterial findings indicates that present diagnostic standards are inadequate.

JENNES, Waterbury, Conn.

SEPTAL SURGERY IN RELATION TO RHINOPLASTY. IRVING B. GOLDMAN, Eye, Ear, Nose & Throat Month. 34:458 (July) and 523 (Aug.) 1955.

The submucous resection became the accepted operation for correction of the deviated septum about the end of the 19th century. Although the Killian operation represented an advance in technique for its time, it was of limited value because the ventral portion of the cartilage must be left to support the nasal dorsum and to maintain the nasal profile. A dislocated caudal end of the septum can not be corrected by this technique because it supports the tip of the nose. The Metzenbaum operation was the first advance in reconstructive surgery for caudal septal deflections. It was, however, of limited value because the mucoperichondrium was liberated on only one side, the mobilized septal segment had to be firm and straight, and a dislocated anterior nasal spine could not be corrected.

When Fomon utilized the rhinoplastic approach for septal surgery, it represented a significant advance in septal surgery. Since Fomon believed that the upper lateral cartilages alone could support the cartilaginous nasal dorsum, he performed complete removal of the septal cartilage. Nevertheless, he reinserted cartilage between the septal flaps to prevent secondary cicatricial contractions and also to prevent an external dorsal depression. After complete removal of the septum, however, a saddling of the nasal dorsum often developed. Although the operation was inadequate, it was a forward step in septal surgery. The use of the transfixion incision facilitated the surgical approach to the septum by improving visibility and allowing increased ease in the elevation of the mucoperichondrium and mucoperiosteum.

The technique devised by Goldman had as its objective the restoration of normal anatomic relationships of the deflected septum with minimal or no sacrifice of the structures. Dislocations of the caudal portion of the septum were corrected by mobilization of the septum to the midline by the use of cartilaginous pedicle flaps. Goldman used the transfixion incision and elevated the mucoperichondrium and the mucoperiosteum on both sides of the septal cartilage and bone. Deviations of the bony septum were corrected by realignment after fracturing or by minimal removal. A persisting obstructive ridge may be resected and a thickened vomer sliced sagitally with removal of excess, leaving a straight septum.

By these means, it is possible to reconstruct the septum with retention of the septal support of the nose in the keystone areas. Rhinoplasty and septal correction may therefore be performed simultaneously. Because the mobilized septal structures are essentially intact, osteotomies may be performed with mesial shifting of the nasal processes without collapse of the nasal dorsum. In rare cases, subtotal or complete resection of the septal cartilage may be required with subsequent reinsertion of septal cartilage implants. This is particularly true in the depressed type of septal deformity, which is usually accompanied by an external saddling deformity. This would then require insertion of dorsal grafts under any circumstances.

In the case of a caudal deflection in a long nose, the application of the rhinoplastic technique allows for the resection of the deflected portion in the course of shortening the nose. It is frequently possible in the case of a moderate caudal deflection of developmental origin to replace the caudal septum by central fracturing of the nasal spine or crest.

By following the principles described by Goldman, it is possible to safely perform a combined rhinoplasty and septal resection and reconstruction. Since the nose has the same relative support as it had before operation, it is not so vulnerable to trauma after healing as the nose in which the septal structures have been widely resected. The combined operation is preferred by the patient for economic reasons, convenience, and the avoidance of a second hospital admission. The accomplishment of a good functional and an assured esthetic result is of benefit to both patient and surgeon.

JENNES, Waterbury, Conn.

ATRESIA OF THE POSTERIOR NARES IN THE INFANT. HENRY H. BEINFIELD, Eye, Ear, Nose & Throat Month. 34:575 (Sept.) 1955.

Atresia of the posterior nares may well be a cause of some cases of asphyxia of the newborn and may be implicated in fatal suffocation of the young infant. It is natural for an infant to breathe only through its nose. Pinching the nostrils of a newborn infant will generally cause a forced attempt at nasal breathing with tight closing of the mouth rather than an attempt to breathe by opening the mouth. This suggests that the infant has no reflex present to cause it to open its mouth to breathe if it cannot breathe through its nose. It further suggests that the natural reflex may be to close the mouth tighter in a normal attempt at forced nasal breathing. Some infants are mouth breathers from the outset, and it is for this reason that some infants with bilateral atresia survive. In unilateral atresia, accidental closure of the normal nostril can create the same problem as bilateral atresia. This may count for some obscure causes of death. In order to provide adequate statistics on this problem, it is important that the pathologists investigate the posterior nares in infants who die from unknown causes.

Beinfield describes in detail a technique for the operative correction of both membranous and bony atresia of the posterior nares, and he includes directions for the postoperative care.

JENNES, Waterbury, Conn.

INTRANASAL DACRYOCYSTORHINOSTOMY, WITH SPECIAL REFERENCE TO FAILURES AND THEIR CAUSE. HARRY BJORK, Acta oto-laryng. 45:479 (Nov.-Dec.) 1955.

Many ophthalmologists even today use dacryocystectomy for dacryocystitis. However, this operation results in permanent disability. This seems to stem from the fact that there has been such a high percentage of failures in dacryocystorhinostomy. Evidence in the literature indicates that this procedure gave good results in an average of 84% of the cases. In an early series the author reported only 59% successes, while in a more recent series with the use of an improved technique he reported success in 95%. To attain this degree of success there should be wide exposure of the sac to include the fornix; septal resection to facilitate the surgery is often desirable. Turbinate resection and trephination from the pyriform aperture are rarely required. Thorough opening of the sac is essential. Revisions are important and may be required in 10%-20% of the cases. Frequently just the use of probes and the removal of granulations will suffice. If canalicular function is good and puncta are placed toward the eyelid, age is not a factor.

ROBERT LEWY, Chicago.

Pharynx

ORAL LEUKOPLAKIA IN ADOLESCENCE DUE TO SULFONAMIDES. ELIO J. FORNATTO and EMANUEL M. SKOLNIK, Eye, Ear, Nose & Throat Month. 34:653 (Oct.) 1955.

Leucoplakia occurred in a 16-year-old white boy with a history of prolonged administration of sulfonamides. Local irritants could not be implicated as etiologic factors. Considering the young age of the patient, a powerful factor must have provoked this lesion. Experimentally, animal studies have been made on the tumor-producing effect of sulfonamides. The authors feel, therefore, that it is not unlikely that a certain relationship must exist between the prolonged administration of sulfonamides and the development of oral leucoplakia in this case. They stress the importance of further experimental and clinical study on the effect of sulfonamides on the mucosa of the oral cavity.

JENNES, Waterbury, Conn.

MALIGNANT PAPILLOMA OF THE TONSILS. MANUEL CHEGA SAGRA, Acta oto-rino-laryng. ibero-am. (Barcelona) 6:449, 1955.

The author presents two cases wherein there were papillomas of the upper pole of the tonsils. One was a typical epithelioma, while the second was a fibroadenoma. The author indicates that every papilloma should be removed and histologic studies be made, since some of these may be epithelioma.

PERSKY, Philadelphia.

MEDICAL CARE OF THE CHILD PATIENT BEFORE AND AFTER ADENOIDECTOMY AND TONSILLECTOMY. EDWARD ORZAC, New York J. Med. 56:886 (March 15) 1956.

This study concerns 500 children, 2 to 12 years of age, who had an adenotonsillectomy during 1954-1955 (covering some 15 months in winter and spring). Care was taken to note any idiosyncrasy to penicillin, the sulfonamides, or codeine, since all these are used under this author's management. Before operation, during seven days, carbazochrome (Adrenosem) in doses of 1 mg. was given t.i.d., and a mixture of benzathine penicillin G and triple sulfonamides, 1 teaspoonful t.i.d. At operation, immediately after induction, 1 cc. of carbazochrome and 1 cc. of procaine penicillin G were given into the muscles. After operation, two hours later, the patient received a third dose of the same drugs given during operation. For six days after operation, each received the benzathine penicillin G-triple sulfonamide mixture in a dosage of 1 teaspoonful plus ¼ grain (15 mg.) of codeine four times a day. Careful records were kept on these patients as to primary and secondary hemorrhage and postoperative infections and were compared with the records of 300 controls, who did not have these medicaments. In all of the medicated patients untoward symptoms and signs were less than 1%. Seven of the controls had otitis media, two bronchopneumonia, three pharyngitis with cervical adenitis, and one had cystitis. The author intends to extol this careful management under the newer medications and concludes that the results of this method are very effective when compared with those found in controls who did not have this regimen.

I. W. VOORHEES, New York.

Miscellaneous

CORTISONE TREATMENT OF CORROSIVE LESIONS OF THE ESOPHAGUS. LAURITZ LUND-IVERSEN, Acta oto-laryng. 45:364 (July-Aug.) 1955.

Two case histories are presented of corrosion of the esophagus by ammonia. These were treated with cortisone and antibiotics. During the treatment the general condition of the patients improved rapidly. There were no complications whatsoever. Complete healing of the esophagus occurred, without the formation of any constricting scars.

ROBERT LEWY, Chicago.

MANAGEMENT OF RESPIRATORY OBSTRUCTION IN HEMOPHILIA. EMANUEL M. SKOLNIK and ELIO J. FORNATTO, Eye, Ear, Nose & Throat Month. 34:435 (July) 1955.

In the management of respiratory obstruction in hemophiliacs, conservative treatment should be attempted first unless the distress is extreme. This requires close collaboration between the otolaryngologist, the hematologist, and the pediatrician or the internist. When conservative treatment fails, a tracheotomy should be performed. A nonhemorrhagic technique is described for tracheotomy which involves clamping of all soft tissues overlying the trachea. Following the incision of the trachea and insertion of the cannula, suture ties are applied very carefully in order to control active bleeding. The application of a sponge soaked in normal human plasma or whole blood to the bleeding spots has been found quite successful. This must be maintained in proper position with a pressure dressing. A similarly soaked gauze-strip packing can be inserted around the trachea tube. General therapy for the blood dyscrasia, including blood transfusions and iodopyracet (Diodrast) intravenously, must be continued in order to reduce the clotting time as much as possible.

JENNES, Waterbury, Conn.

RADIUM THERAPY IN BENIGN LESIONS OF THE EARS, NOSE AND THROAT. J. COLEMAN SCAL, Eye, Ear, Nose & Throat Month. 34:444 (July) 1955.

The technique for the application of radium for certain benign lesions of the ear, nose, and throat is described in detail. These include nasal polyposis, epistaxis, hypertrophied lymphoid

tissue of the nasopharynx, diseased tonsils, nasopharyngeal tumors, and papilloma of the cheek, tongue, and tonsils.

JENNES, Waterbury, Conn.

CHLORPROMAZINE (THORAZINE) AS PREOPERATIVE MEDICATION IN OPHTHALMOLOGY AND OTOLARYNGOLOGY. MILO H. FRITZ, Eye, Ear, Nose & Throat Month. 34:515 (Aug.) 1955.

In a series of 25 patients the only variation from the previous routine preoperative medication was the addition of one 50 mg. dose of chlorpromazine (Thorazine), administered intramuscularly two hours before operation. The routine medication included a barbiturate administered the evening before operation and 100 mg. of meperidine (Demerol) given parentally one hour before surgery. The operations were all performed under local anesthesia. In patients operated on previous to this study, nausea, vomiting, anxiety, and pain were present to the point of interference, with the smooth performance of the operation in an estimated one-third to one-half of the cases. The author reports the complete absence of nausea, vomiting, and anxiety in the cases in which chlorpromazine was administered. Somnolence was pronounced, and amnesia was noted frequently. Chlorpromazine is therefore an extremely valuable addition to preoperative medication in patients operated on under local anesthesia.

JENNES, Waterbury, Conn.

DIAGNOSIS AND TREATMENT OF PAROTID CALCULI. JAMES R. BLAIR, Laryngoscope 65:848 (Sept.) 1955.

Parotid calculi are not frequent and are apt to be small and not palpable. They are difficult to visualize by x-ray but may be revealed by sialography. The calculi most frequently lodge over the junction of the main and accessory ducts, making them more amenable to conservative treatment. The duct may be dilated with a catheter and the stone grasped with a Hartman forceps or curetted and removed piecemeal. Occasionally a horizontal incision may have to be made to expose the duct. After the stone is removed, the duct is sutured and an indwelling catheter is left in place by means of a skin clip.

HITSCHLER, Philadelphia.

RHINOBRONCHOLOGY. A. SOULAS, Acta oto-rhino-laryng. 9:367, 1955.

The author discusses the interrelationship between the upper respiratory infections and those affecting the bronchial tree. He classifies these relationships under the following: (1) functional basis, where upper respiratory conditions have a direct relationship on the pulmonary ventilation; (2) neurovegetative basis, where vasomotor reactions have a direct action on both the nasal passages and the bronchi (these may be activated by acute infections which may originate in the upper respiratory tract); finally, (3) organic basis, where malformations may have an interrelationship between the upper and lower respiratory tracts. The author feels that there must be a close relationship between the rhinologist and the bronchoscopist, since there is a pathologic relationship between the upper and lower respiratory tracts not only from the basis of etiology and diagnosis but also from the standpoint of therapy. Careful evaluation must be established of the anatomic-pathologic conditions in the nose, pharynx, esophagus, and bronchi. There must be a close interrelationship between the bronchoscopist, esophagoscopist, rhinolaryngologist, phthisiologist, pediatrician, cancerologist, physiologist, and the gastroenterologic surgeons.

PERSKY, Philadelphia.

GLOMUS JUGULARIS. A. J. M. ROCA DE VINALS, Acta oto-rino-laryng. (Barcelona) 6:458, 1955.

The author presents two cases, one of which was a typical glomus tumor. The second case was primarily diagnosed as a glomus tumor but eventually was proved to be that of extensive cerebellar abscess adherent to the dura. He presents some of the difficulties of differential diagnosis and stresses the importance of various diagnostic aids plus surgical intervention in the final conclusions as to the pathology present.

PERSKY, Philadelphia.

AEROSOL THERAPY IN THE PRACTICE OF ALLERGY. SAMUEL J. PRIGAL, New York J. Med. 56: 910 (March 15) 1956.

Prigal is the Editor of the Fundamentals of Modern Allergy, a series of articles sponsored by the New York Allergy Society. He is a worker in the Allergy Clinic of the New York

Medical College, Flower-Fifth Avenue Hospital. This study takes up the nature of aerosols and the rationale of their use. They are classified as bronchodilators, antibiotics, and mucolytics. The latter have to do with breaking-up the gum-like secretions so that they can be coughed out or removed by suction. Certain limitations and abuses of aerosols are to be kept in mind: (1) employment of unsuitable apparatus and inhalation of particles either too small or too large; (2) too great concentration of agents used, thus causing bronchial irritation; (3) use of cold aerosols, which produces "coughing spells"; (4) continued use of oxygen or air, thus drying the mucous membrane (gases should be passed through water before nebulization); (5) aerosols of antibiotics should be given regularly and frequently enough, not "once or twice weekly." Aerosols of antibiotics should not be given during an asthmatic attack. In bronchospasm, inhalations are likely not to reach the intended areas and so are futile. Aerosols are of special value in allergy but must be used with precision and understanding.

I. W. VOORHEES, New York.

Directory of Otolaryngological Societies *

FOREIGN AND INTERNATIONAL

Canadian Otolaryngological Society

(Société Canadienne d'Otolaryngologie)

President: Dr. D. S. Gorrell, 110 Medical Arts Building, Calgary, Alta.
Secretary: Dr. G. Arnold Henry, 328 Medical Arts Building, Toronto.

International Bronchoesophagological Society

President: Dr. Antonio da Costa Quinta, Lisbon, Portugal.
Secretary: Dr. Chevalier L. Jackson, 3401 N. Broad St., Philadelphia 40.
Meeting: Fourth International Congress of Bronchoesophagology.
President of Congress: Dr. Antonio Carrascosa.

International Congress of Audiology

Place: Leyden, Netherlands.
General Secretary: Dr. H. C. Huizing, 182 Oostersingel, Groningen, Netherlands.

International Course in Paedo-Audiology

Place: Groningen, Netherlands.
General Secretary: Dr. H. C. Huizing, 182 Oostersingel, Groningen, Netherlands.

Pan-American Association of Oto-Rhino-Laryngology and Broncho-Esophagology

President: Dr. Juan Manuel Tato, Azcuenaga 235, Buenos Aires, Argentina.
Secretary: Dr. Chevalier L. Jackson, 3401 N. Broad St., Philadelphia 40.

Sixth International Congress of Otolaryngology

President: Dr. Arthur W. Proetz, 3720 Washington Blvd., St. Louis.
General Secretary: Dr. Paul H. Holinger, 700 N. Michigan Ave., Chicago 11.
Place: Hotel Statler, Washington, D. C. Time: May 5-10, 1957.

NATIONAL

American Medical Association, Scientific Assembly, Section on Laryngology, Otology and Rhinology

Chairman: Dr. John R. Lindsay, Chicago.
Secretary: Dr. Hugh A. Kuhn, 112 Rimbach St., Hammond, Ind.

American Academy of Ophthalmology and Otolaryngology

President: Dr. Algernon B. Reese, 73 E. 71st St., New York 21.
Executive Secretary-Treasurer: Dr. William L. Benedict, 100-1st Ave., Bldg., Rochester, Minn.

American Board of Otolaryngology

President: Dr. Frederick T. Hill, Professional Building, Waterville, Maine.
Secretary-Treasurer: Dr. Dean M. Lierle, University Hospitals, Iowa City.

American Broncho-Esophagological Association

President: Dr. Daniel S. Cunning, 115 E. 65th St., New York 21.
Secretary: Dr. F. Johnson Putney, 1719 Rittenhouse Sq., Philadelphia 3.

American Laryngological Association

President: Dr. LeRoy A. Schall, 243 Charles St., Boston 14.
Secretary: Dr. Harry P. Schenck, 326 S. 19th St., Philadelphia 3.
Place: Washington, D. C. Time: May 3, 1957.

American Laryngological, Rhinological and Otological Society, Inc.

President: Dr. Dean M. Lierle, Iowa City.
Secretary: Dr. C. Stewart Nash, 708 Medical Arts Bldg., Rochester 7, N. Y.

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* Secretaries of societies are requested to furnish the information necessary to keep this list up to date.

SECTIONS:

Eastern.—Chairman: Dr. John A. Murtagh, Hanover, N. H.
Southern.—Chairman: Dr. J. M. Robison, Houston, Texas.
Middle.—Chairman: Dr. William H. Craddock, Cincinnati.
Western.—Chairman: Dr. David D. DeWeese, Portland, Ore.

AMERICAN OTOLOGICAL SOCIETY, INC.

President: Dr. William J. McNally, 1509 Sherbrooke St. West, Montreal 25, Canada.
Secretary-Treasurer: Dr. Lawrence R. Boies, 90 S. Ninth St., Minneapolis 2.

AMERICAN OTORHINOLOGIC SOCIETY FOR THE ADVANCEMENT OF PLASTIC AND RECONSTRUCTIVE SURGERY, INC.

President: Dr. Joseph Gilbert.
Secretary: Dr. Louis Joel Feit, 66 Park Ave., New York 16.

AMERICAN SOCIETY OF OPHTHALMOLOGIC AND OTOLARYNGOLOGIC ALLERGY

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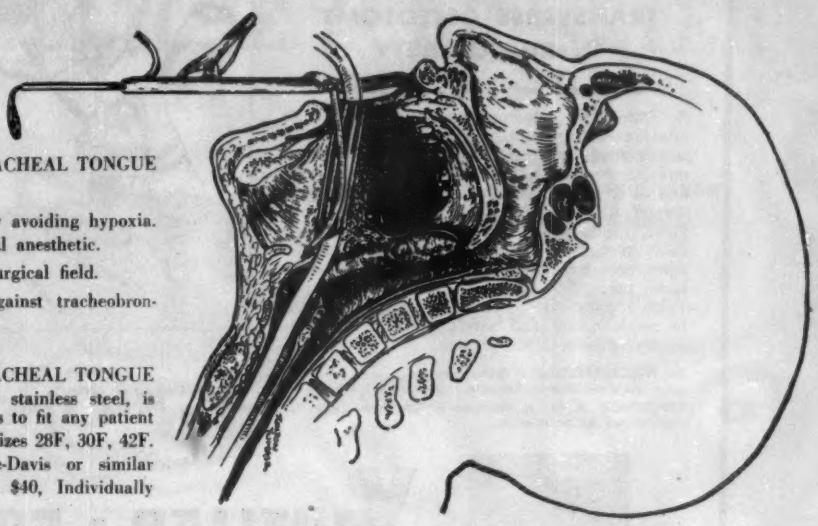

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*Barton, R. T.: Instrument for endotracheal anesthesia during oro-pharyngeal surgery. J. A. M. A. 153:1017 (Nov. 14) 1953.

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REFERENCE: A. M. A. Archives of Otolaryngology, Gottschalk, September, 1955. Illustrations reproduced by permission.

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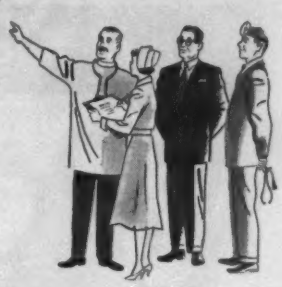

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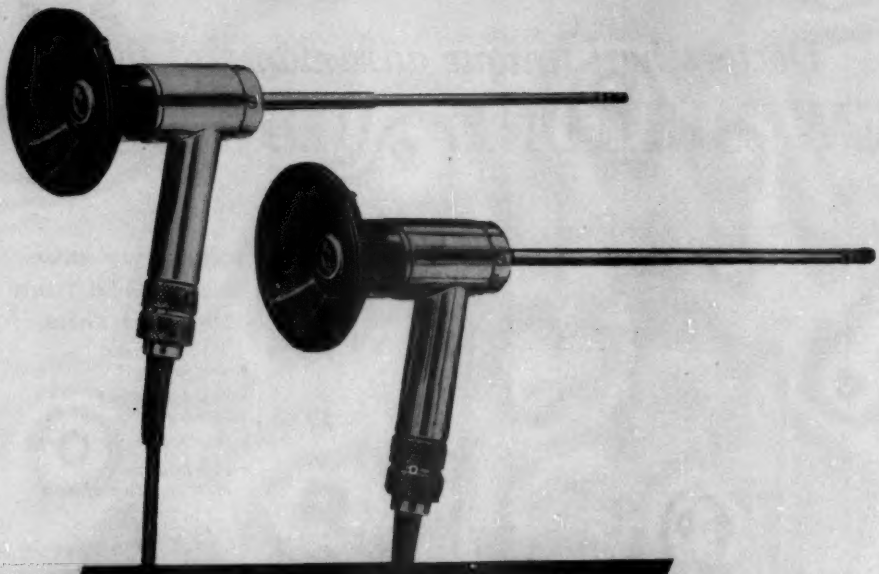

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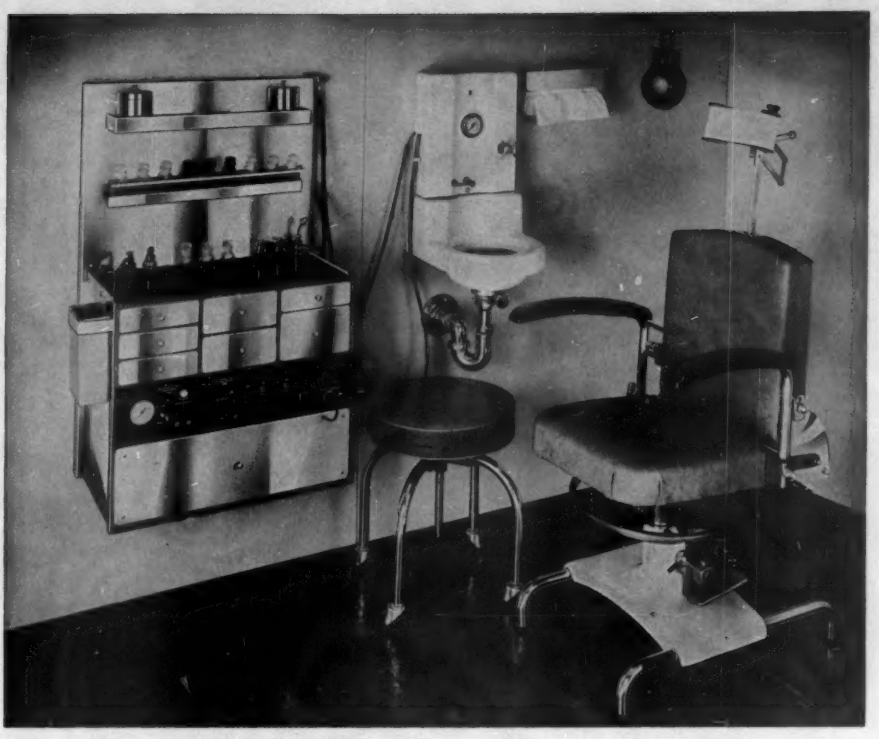

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